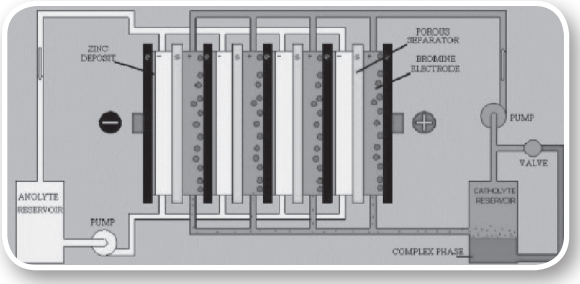
CHAPTER 2

Energy Use by Type of Fuel

Wisconsin's Contributions to the Advancement of Renewable Energy

Making Renewable Energy Dispatchable through Storage—ZBB Energy Corporation

In Wisconsin, we know certain things very well. The sun doesn't always shine. The wind doesn't always blow. If local company ZBB's particular brand of energy storage takes off, these may not be problems anymore.



ZBB wants to increase the intelligent storage and use of alternative energies like wind and solar power. The company itself isn't the only one who sees potential in this idea. In December 2009, ZBB was granted a million dollars through Wisconsin's State Energy Program, to help with development of its energy management technology. A month later, the U.S. Department of Energy awarded ZBB more than $14.5 million in clean energy tax credits.

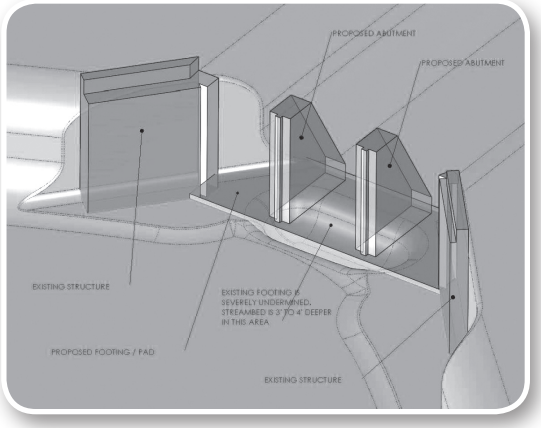
Based in Menomonee Falls, ZBB manufactures zinc bromide batteries, otherwise known as flow batteries. These batteries can be used (1) on- and off-the-grid by consumers during peak electric hours, lessening their energy costs while reducing reliance on power from the grid and, (2) at night or in calm weather, powering machines through the use of stored energy when solar or wind power are not directly available.

ZBB's type of stored energy can be used by homeowners, utility companies, and everyone in between. This spells a literally brighter future for those with little to no access to an electrical grid, such as citizens of many third world countries. Flow battery technology can be used as a source of alternative energy, remedying the lack of electricity while bringing environmentally-friendly power to people who need it.

Improving Hydroelectric Turbine Efficiency—Steinbine Development LLC

Drawing hydroelectric power from a dam is no simple task. Though the amount of water passing through a dam every day is large (depending on the site), the kinetic energy that can be converted to energy is surprisingly small. Until now.

Steinbine Development LLC, a national company with facilities in Sullivan, is working to improve the efficiency of energy generation from hydroelectric turbines in the nation's dams. A recipient of a grant from the Wisconsin Energy Independence Fund, Steinbine is in the process of redesigning impulse turbines to better help convert energy that would otherwise be … water over the dam. Their goal is to create energy recovery technology to be used in an open channel of falling water, harnessing energy that would usually be lost.



In Sullivan, Steinbine is working on a municipally-owned small dam to determine the feasibility of restoring hydroelectric generation when the facility is not being used as a scale model hydro-lab. The feasibility is determined by many factors—including how more efficient turbine technology can increase the capacity, and make operation of a small dam worthwhile for the surrounding community, without significantly changing the natural environment.

Wisconsin Petroleum Use, by Economic Sector

1970-2008 TRILLIONS OF BTU AND PERCENT OF TOTAL

Year	Residential		Commercial		Industrial		Agricultural[a]		Transportation		Electric Utility		Total
1970	107.9	*23.6%*	31.5	*6.9%*	21.1	*4.6%*	18.1	*4.0%*	271.2	*59.3%*	7.9	*1.7%*	457.7
1975	87.6	*18.4%*	27.5	*5.8%*	19.3	*4.1%*	18.8	*4.0%*	314.0	*66.1%*	7.8	*1.6%*	475.0
1980	71.2	*15.7%*	14.6	*3.2%*	13.2	*2.9%*	21.4	*4.7%*	329.2	*72.4%*	4.8	*1.1%*	454.4
1985	51.7	*12.5%*	16.0	*3.9%*	9.4	*2.3%*	19.2	*4.7%*	314.4	*76.3%*	1.4	*0.3%*	412.1
1990	42.6	*9.6%*	15.0	*3.4%*	22.1	*5.0%*	16.0	*3.6%*	347.7	*78.2%*	1.0	*0.2%*	444.4
1995	40.8	*8.6%*	13.4	*2.8%*	18.5	*3.9%*	15.6	*3.3%*	384.2	*81.2%*	0.8	*0.2%*	473.3
1996	43.5	*8.9%*	14.2	*2.9%*	20.9	*4.3%*	15.9	*3.3%*	393.2	*80.5%*	0.9	*0.2%*	488.6
1997	40.5	*8.2%*	13.1	*2.7%*	20.8	*4.2%*	15.3	*3.1%*	401.5	*81.5%*	1.5	*0.3%*	492.7
1998	33.9	*6.9%*	10.8	*2.2%*	19.1	*3.9%*	14.5	*3.0%*	411.3	*83.7%*	1.8	*0.4%*	491.4
1999	36.6	*7.2%*	11.6	*2.3%*	21.2	*4.2%*	15.0	*2.9%*	422.2	*83.0%*	2.0	*0.4%*	508.6
2000	38.8	*7.7%*	12.1	*2.4%*	20.5	*4.1%*	14.4	*2.9%*	416.0	*82.6%*	1.6	*0.3%*	503.4
2001	36.7	*7.3%*	11.6	*2.3%*	25.0	*4.9%*	14.0	*2.8%*	417.5	*82.5%*	1.3	*0.3%*	506.0
2002	38.0	*7.4%*	11.8	*2.3%*	19.3	*3.7%*	14.4	*2.8%*	430.1	*83.4%*	2.1	*0.4%*	515.6
2003	35.4	*6.9%*	14.5	*2.8%*	13.4	*2.6%*	14.6	*2.9%*	430.3	*84.5%*	1.3	*0.2%*	509.4
2004	39.0	*7.4%*	14.7	*2.8%*	18.0	*3.4%*	14.3	*2.7%*	438.7	*83.4%*	1.5	*0.3%*	526.2
2005	37.6	*7.4%*	14.7	*2.9%*	20.7	*4.1%*	13.5	*2.7%*	417.9	*82.5%*	1.8	*0.4%*	506.3
2006[r]	36.6	*7.3%*	11.7	*2.3%*	19.4	*3.9%*	17.2	*3.4%*	412.5	*82.7%*	1.4	*0.3%*	498.8
2007[r]	34.0	*6.8%*	11.3	*2.3%*	20.0	*4.0%*	18.6	*3.7%*	415.2	*82.9%*	1.7	*0.3%*	500.7
2008[p]	**34.6**	***7.2%***	**13.2**	***2.7%***	**15.0**	***3.1%***	**17.7**	***3.7%***	**400.2**	***83.1%***	**1.1**	***0.2%***	**481.8**

a OEI discontinued a per-acre approach to gathering fuel data for the agriculture sector and substituted data from the Wisconsin Department of Revenue and the federal National Agriculture Statistics Service (NASS). Data from NASS were not available previously.

p Preliminary estimates.

r Revised.

Source: Wisconsin Department of Commerce, Bureau of Petroleum Inspection, *Report on Petroleum Products Inspected and Delivered to Wisconsin* (1970-1995); Wisconsin Department of Revenue, *Collection of Petroleum Inspection Fees* (1996-2006) and *Fuel Tax Statistical Report* (1996-2008); Office of Energy Independence phone surveys of airport fixed base operators and railways; U.S. Department of Energy, Form EIA-782C, "Monthly Report of Petroleum Products Sold Into States for Consumption" (1983-2008); U.S. Department of Energy, Form EIA-821 (2003-2008); unpublished data from the National Agriculture Statistics Service.

OVERALL PETROLEUM USE
3.8%

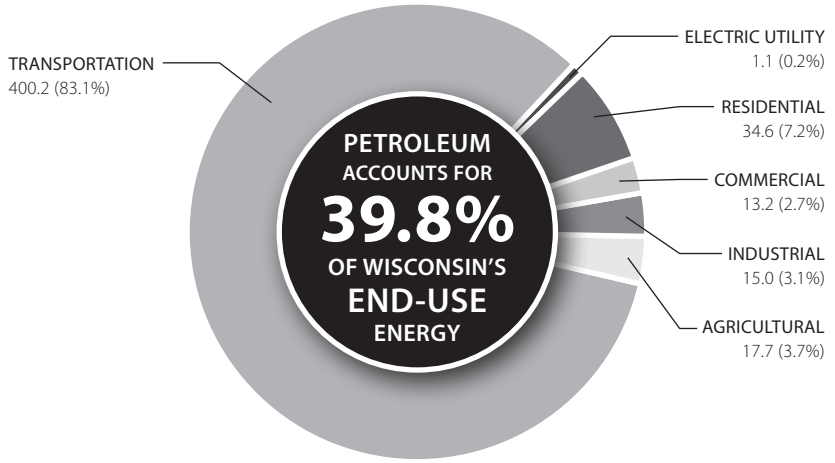
Overall petroleum use measured in British thermal units (Btu) decreased 3.8 percent in 2008.

In 2008, 83.1 percent of the petroleum used in Wisconsin was for transportation, which saw a decrease of 3.6 percent.

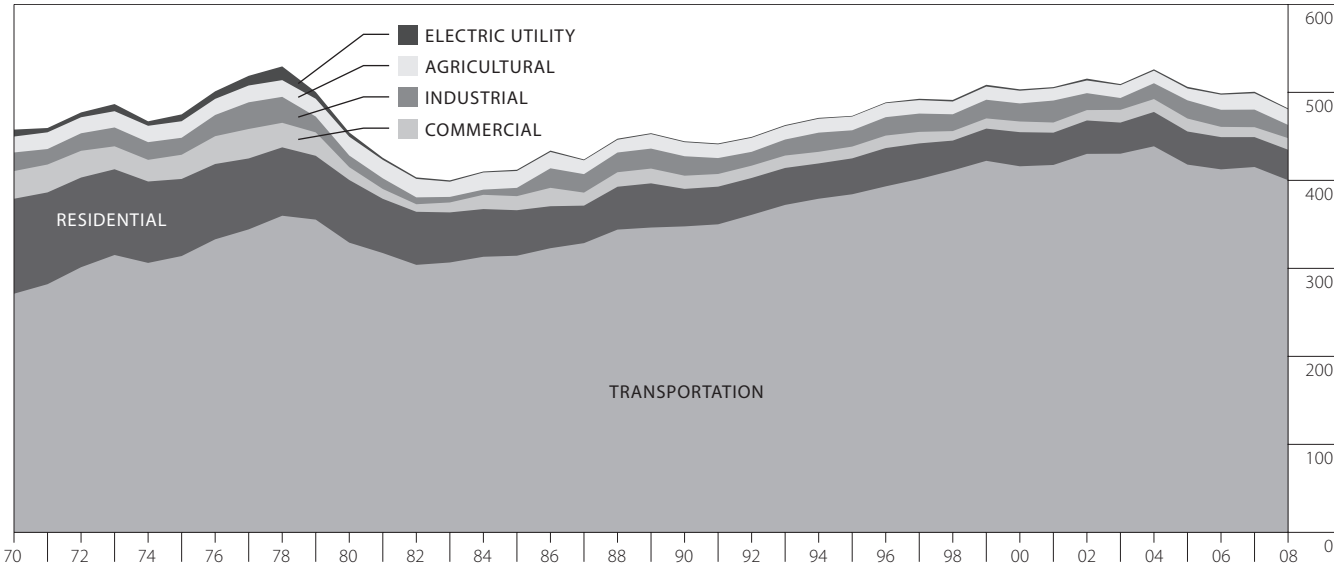
Agriculture sector numbers do not include agricultural processing plants; these are classified in the commercial sector.

Wisconsin Petroleum Use, by Economic Sector

2008 TRILLIONS OF BTU AND PERCENT OF TOTAL



1970-2008 TRILLIONS OF BTU



Source: Wisconsin Office of Energy Independence.

Wisconsin Petroleum Use, in Btu, by Type of Product

1970-2008 TRILLIONS OF BTU

Year	Gasoline[a,b]	Jet Fuel	Light Distillate	Middle Distillate	Residual Fuel Oil	LPG[c]	Total
1970	244.1	7.7	35.1	123.4	21.9	25.7	457.9
1975	275.4	9.8	16.9	133.5	13.3	26.0	474.9
1980	271.3	11.0	11.3	124.7	11.0	25.2	454.5
1985	254.3	8.4	13.4	110.7	2.3	23.1	412.2
1990	267.8	11.0	10.8	122.3	7.9	24.8	444.6
1995	285.3	10.6	9.6	131.3	7.6	30.9	475.3
1996	292.2	11.1	10.4	136.2	6.8	34.2	490.9
1997	297.0	11.3	10.7	137.4	6.8	31.8	495.0
1998	304.2	11.5	10.9	135.5	4.9	27.3	494.3
1999	312.2	11.8	11.2	142.0	5.0	29.4	511.6
2000	307.7	11.7	11.1	141.1	5.3	30.3	507.2
2001	309.7	11.5	11.2	142.2	5.6	27.7	507.9
2002	320.3	11.9	11.1	141.5	4.3	30.1	519.1
2003	322.7	11.6	11.6	134.0	5.8	29.2	515.0
2004	322.5	12.5	12.5	146.1	7.2	30.3	531.2
2005[r]	309.3	14.3	11.6	135.0	8.6	27.5	506.3
2006[r]	299.2	13.9	11.6	137.8	4.5	31.8	498.8
2007[r]	304.3	12.8	10.4	137.5	4.9	30.9	500.9
2008[p]	**287.5**	**13.8**	**10.9**	**134.4**	**4.0**	**31.3**	**481.8**

Middle distillate is used both as a heating fuel in furnaces and boilers, and as diesel fuel in trucks. Light distillate includes kerosene and is primarily used as a thinner during periods of cold weather.

a Includes both vehicle and aviation gasoline.

b Does not include ethanol. Ethanol use in motor gasoline is shown in the Renewable Energy chapter and on page 35.

c Liquefied petroleum gas (propane).

p Preliminary estimates.

r Revised.

Source: Wisconsin Department of Commerce, Bureau of Petroleum Inspection, *Report on Petroleum Products Inspected and Delivered to Wisconsin* (1970-1995); Wisconsin Department of Revenue, *Collection of Petroleum Inspection Fees* (1996-2006) and *Fuel Tax Statistical Report* (1996-2008); U.S. Department of Energy, Form EIA-782C, "Monthly Report of Petroleum Products Sold into States for Consumption" http://www.eia.doe.gov/oil_gas/petroleum/data_publications/prime_supplier_report/psrh_2008_09.html. (1983-2008); WI Office of Energy Independence telephone surveys of airport fixed base operators and railways; unpublished expenditure data from the National Agriculture Statistics Service (2005-2009).

Wisconsin Petroleum Use, in Gallons, by Type of Product

GASOLINE USE 5.5%

In 2008, gasoline use decreased by 5.5 percent.

JET FUEL USE 8.2%

LP USE 1.0%

Jet fuel increased by 8.2 percent, and LP use increased by 1.0 percent.

1970-2008 MILLIONS OF GALLONS

Year	Gasoline[a,b]	Jet Fuel	Light Distillate	Middle Distillate	Residual Fuel Oil	LPG[c]	Total
1970	1,953.0	56.7	260.2	889.7	146.2	269.0	3,574.8
1975	2,203.5	72.4	125.0	962.8	88.8	272.6	3,725.1
1980	2,170.5	81.4	83.4	899.4	73.5	264.1	3,572.3
1985	2,033.3	62.2	99.2	798.2	15.5	241.5	3,249.9
1990	2,139.5	81.6	80.1	882.2	52.7	260.2	3,496.3
1995	2,266.6	78.6	72.3	946.4	50.5	323.8	3,738.2
1996	2,319.8	82.0	77.3	982.2	45.2	357.9	3,864.4
1997	2,357.3	84.0	79.4	990.5	45.6	332.9	3,889.7
1998	2,410.3	85.0	80.8	976.6	32.8	285.9	3,871.4
1999	2,473.7	87.4	82.9	1,024.3	33.1	307.7	4,009.1
2000	2,431.2	87.0	82.2	1,017.4	35.4	317.5	3,970.7
2001	2,450.1	85.0	82.9	1,025.6	37.2	306.1	3,986.9
2002	2,533.7	88.2	82.3	1,020.3	28.8	314.7	4,068.0
2003	2,549.0	86.1	82.0	1,025.8	26.4	322.6	4,091.9
2004	2,555.6	92.5	86.1	1,059.4	45.5	321.6	4,160.7
2005[r]	2,474.6	105.7	86.2	973.2	57.1	288.4	3,985.3
2006[r]	2,393.6	102.9	86.1	993.5	30.1	332.6	3,938.8
2007[r]	2,434.2	94.6	77.3	991.7	32.9	323.9	3,954.5
2008[p]	**2,299.6**	**102.4**	**80.4**	**968.9**	**26.9**	**327.3**	**3,805.4**

a Includes both vehicle and aviation gasoline.

b Does not include the ethanol component of reformulated gasoline or gasohol; refer to page 35 of this chapter and the Renewable Energy chapter.

c Liquefied petroleum gas (propane).

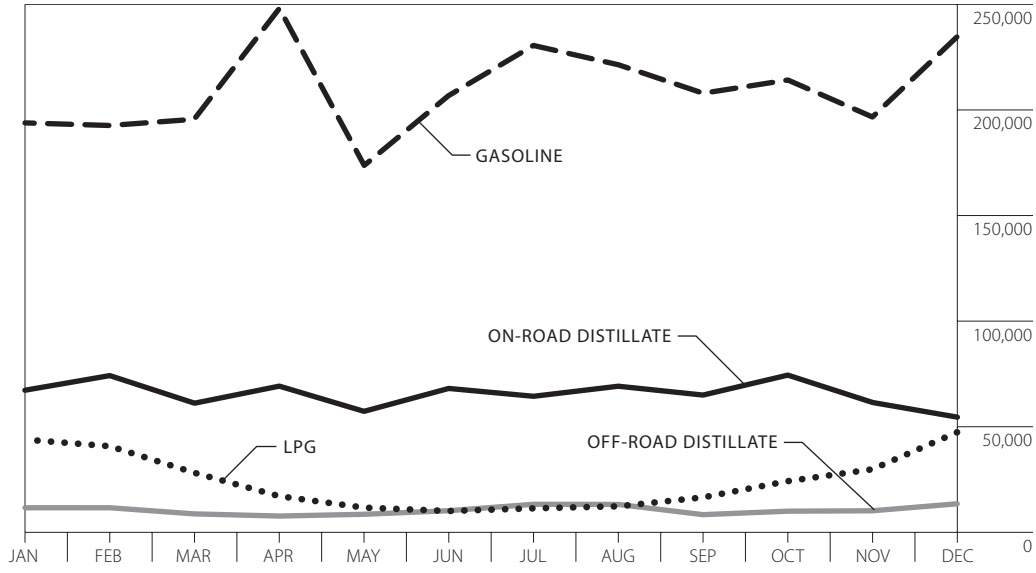
p Preliminary estimates.

r Revised.

Source: Wisconsin Department of Commerce, Bureau of Petroleum Inspection, *Report on Petroleum Products Inspected and Delivered to Wisconsin* (1970-1995); Wisconsin Department of Revenue, *Collection of Petroleum Inspection Fees* (1996-2006) and *Fuel Tax Statistical Report* (1996-2008); U.S. Department of Energy Form EIA-782C, "Monthly Report of Petroleum Products Sold into States for Consumption" (1983-2008) http://www.eia.doe.gov/oil_gas/petroleum/data_publications/prime_supplier_report/psrh_2008_09.html; WI Office of Energy Independence telephone surveys of airport fixed base operators and railways; unpublished data from the National Agriculture Statistics Service (2005-2008).

Petroleum Product Deliveries to Wisconsin, by Month

2008 THOUSANDS OF GALLONS



Month	Off-Road Distillate[a]	On-Road Distillate[b]	LPG[c]	Gasoline[d]
January	*11,318*	66,967	43,600	193,542
February	11,321	73,889	40,460	192,318
March	8,409	60,818	27,853	195,262
April	7,403	68,898	16,793	247,477
May	8,230	56,957	11,390	173,239
June	*9,912*	67,811	9,782	206,456
July	*12,962*	64,097	11,046	230,195
August	12,896	68,864	11,998	221,071
September	*8,048*	64,679	16,235	207,585
October	*9,700*	74,116	23,906	213,840
November	*9,891*	61,160	29,540	196,289
December	*13,205*	54,220	47,080	234,297
Total	**123,295**	**782,476**	**289,683**	**2,511,570**

a Kerosene, No. 1 and No. 2 fuel oil used for heating and processing, jet fuel and aviation gasoline used for flying. Does not include non-taxed diesel fuel used on farms. Numbers in italics are incomplete data because some data are withheld by the federal Energy Information Administration to protect reporter identification.

b On-road diesel fuel.

c Liquefied petroleum gas (propane).

d Vehicle gasoline only; does not include aviation gasoline.

Source: Wisconsin Department of Revenue, *Monthly Motor Fuel Consumption Report* (2008); U.S. Department of Energy, Form EIA-782C, "Monthly Report of Petroleum Products Sold into States for Consumption" (2008) http://www.eia.doe.gov/oil_gas/petroleum/data_publications/prime_supplier_report/psrh_2008_09.html.

In general, gasoline deliveries peaked during the summer vacation months, while sales of fuels used for heating (off-road distillate and LPG) peaked during winter months.

A map of Wisconsin's petroleum pipelines can be found in the Map Appendix on page 149. Figures will not match the consumption figures in earlier pages in this chapter because deliveries do not always translate to sales during the same time frame.

Wisconsin Production and Use of Ethanol in Reformulated Gasoline, E10 and E85

ETHANOL PRODUCTION
42.6%

In 2008, Wisconsin ethanol production jumped 42.6 percent. Ethanol use in Wisconsin increased 34.6 percent with increased consumption of RFG, E10 and E85.

The increase in ethanol usage in Wisconsin is related to a number of factors including: major oil companies blending ethanol with gasoline at retail locations to stretch gasoline; the number of E85 gas stations increased[d]; retail outlets where E85 is sold are likely to sell E10 at their other pumps; and the increase in overall ethanol production leads to an increased market share for ethanol-blended fuels.

Ethanol is one of the few energy sources that Wisconsin exports.

1994-2008 THOUSANDS OF GALLONS

		Consumption			
Year	Production	RFG[a]	E10[b]	E85[c]	Total
1994	NA	NA	13,331	9	13,340
1995	NA	38,048	10,461	17	48,526
1996		49,784	6,973	36	56,793
1997		49,460	8,012	54	57,526
1998		66,571	4,877	58	71,506
1999		67,400	7,937	63	75,400
2000	NA	70,724	23,080	43	93,847
2001	NA	67,449	18,458	32	85,939
2002	15,529	71,152	17,026	48	88,226
2003	76,947	77,302	23,536	86	100,924
2004	106,886	74,816	27,617	106	102,539
2005	171,764	73,046	49,186	723	122,955
2006	210,386	77,614	50,487	2,302	130,403
2007	283,800	69,963	87,128	4,144	161,235
2008	**404,557**	**68,047**	**144,606**	**4,343**	**216,996**

a RFG is reformulated gasoline. Starting January 1, 1995, the federal government mandated its sale in six southeastern Wisconsin counties to comply with the Clean Air Act. Ethanol is used to provide the oxygenate required in RFG.

b E10 is a motor fuel blend consisting of 10 percent ethanol and 90 percent conventional gasoline (non RFG).

c E85 is a motor fuel consisting of 85 percent ethanol and 15 percent gasoline.

d From August 2008 to August 2009, the number of E85 gas stations increased from 111 to 125.

NA – Not available.

Source: Wisconsin Department of Revenue; Wisconsin Office of Energy Independence survey of E85 distributors; U.S. Department of Energy, Form EIA-782C, "Monthly Report of Petroleum Products Sold into States for Consumption" (2008) http://www.eia.doe.gov/oil_gas/petroleum/data_publications/prime_supplier_report/psrh_2008_09.html.

Wisconsin Liquefied Petroleum Gas Use, by Economic Sector

1970-2008 MILLIONS OF GALLONS AND PERCENT OF TOTAL

Year	Residential		Commercial		Industrial		Agricultural[a]		Transportation		Total
1970	190.9	*70.9%*	23.8	*8.8%*	28.2	*10.5%*	26.2	*9.7%*	NA	*0.0%*	269.1
1975	176.5	*64.7%*	36.5	*13.4%*	29.5	*10.8%*	30.1	*11.0%*	NA	*0.0%*	272.6
1980	176.3	*66.7%*	33.5	*12.7%*	17.5	*6.6%*	36.9	*14.0%*	NA	*0.0%*	264.2
1985	158.2	*65.5%*	29.4	*12.2%*	19.3	*8.0%*	34.6	*14.3%*	NA	*0.0%*	241.5
1990	162.1	*62.3%*	36.5	*14.0%*	35.7	*13.7%*	25.9	*10.0%*	NA	*0.0%*	260.2
1995	203.8	*62.9%*	48.0	*14.8%*	35.0	*10.8%*	30.9	*9.5%*	6.1	*1.9%*	323.8
1996	219.5	*61.3%*	51.7	*14.4%*	43.9	*12.3%*	36.8	*10.3%*	6.0	*1.7%*	357.9
1997	210.3	*63.2%*	48.7	*14.6%*	35.0	*10.5%*	33.1	*9.9%*	5.8	*1.7%*	332.9
1998	183.5	*64.2%*	42.4	*14.8%*	30.1	*10.5%*	24.2	*8.5%*	5.7	*2.0%*	285.9
1999	197.9	*64.3%*	45.8	*14.9%*	31.3	*10.2%*	27.6	*9.0%*	5.1	*1.7%*	307.7
2000	211.0	*66.5%*	47.2	*14.9%*	28.7	*9.0%*	25.3	*8.0%*	5.3	*1.7%*	317.5
2001	204.0	*66.6%*	45.8	*15.0%*	28.3	*9.2%*	23.4	*7.6%*	4.6	*1.5%*	306.1
2002	213.1	*67.7%*	47.6	*15.1%*	26.0	*8.3%*	24.0	*7.6%*	4.0	*1.3%*	314.7
2003	224.0	*69.4%*	50.0	*15.5%*	22.0	*6.8%*	22.8	*7.1%*	3.8	*1.2%*	322.6
2004	221.3	*68.8%*	49.5	*15.4%*	23.1	*7.2%*	24.1	*7.5%*	3.6	*1.1%*	321.6
2005[r]	198.5	*68.8%*	43.6	*15.1%*	20.7	*7.2%*	22.7	*7.9%*	3.0	*1.0%*	288.4
2006[r]	228.3	*68.7%*	50.2	*15.1%*	23.8	*7.1%*	27.1	*8.1%*	3.2	*1.0%*	332.6
2007[r]	224.6	*69.4%*	49.4	*15.3%*	23.4	*7.2%*	24.1	*7.5%*	2.3	*0.7%*	323.9
2008[p]	**221.2**	***67.6%***	**48.7**	***14.9%***	**23.1**	***7.1%***	**31.8**	***9.7%***	**2.5**	***0.8%***	**327.3**

NA – Not available.

a Starting with 2005 data, OEI discontinued a per-acre approach to gathering fuel data for the agriculture sector and substituted data from the Wisconsin Department of Revenue and from the federal National Agriculture Statistics Service (NASS).

r Revised

p Preliminary estimates.

Source: U.S. Department of Energy, Form EIA-25, "Prime Supplier's Monthly Report" (1974-2008) and Form EIA-782C, "Monthly Report of Petroleum Products Sold into States for Consumption" (1983-2008) http://www.eia.doe.gov/oil_gas/petroleum/data_publications/prime_supplier_report/psrh_2008_09.html; National Agricultural Statistics Service, unpublished data (2005-2008); Wisconsin Department of Revenue, *Monthly Motor Fuel Consumption Report* (2008).

Liquefied petroleum gas (LPG), (propane), use increased 1.0 percent in 2008.

Agriculture sector numbers do not include agricultural processing plants; these are classified in the commercial sector.

Increased usage of LP in the Agricultural sector is likely related to crop drying applications.

Wisconsin Natural Gas Use, by Economic Sector

NATURAL GAS USED TO GENERATE ELECTRICITY
24%

In 2008, cold winter weather led to increased natural gas use in the residential sector. In the electric sector, natural gas used to generate electricity increased by 24 percent. The electric sector includes natural gas used by utilities and independent power producers who generate and sell electricity to other companies. Overall, natural gas use increased by 6.8 percent from 2007. Natural gas use is up 21.6 percent from 1990.

A map of Natural Gas Company Territories and Major Pipelines can be found in the Map Appendix on page 150.

1970-2008 TRILLIONS OF BTU AND PERCENT OF TOTAL

Year	Residential		Commercial[a]		Industrial		Electric[b]		Total	Total End Use
1970	109.4	*33.2%*	42.2	*12.8%*	147.1	*44.6%*	31.1	*9.4%*	329.8	298.7
1975	119.2	*32.6%*	57.0	*15.6%*	169.1	*46.3%*	19.8	*5.4%*	365.1	345.3
1980	124.5	*36.1%*	61.4	*17.8%*	144.5	*41.9%*	14.1	*4.1%*	344.5	330.4
1985	117.7	*38.6%*	59.8	*19.6%*	126.1	*41.3%*	1.4	*0.5%*	305.0	303.6
1990	114.7	*37.4%*	66.7	*21.8%*	122.6	*40.0%*	2.4	*0.8%*	306.4	304.0
1995	137.5	*36.1%*	85.8	*22.5%*	147.7	*38.8%*	10.1	*2.7%*	381.1	371.0
1996	149.8	*37.1%*	96.1	*23.8%*	150.4	*37.3%*	7.4	*1.8%*	403.7	396.3
1997	137.3	*34.3%*	89.7	*22.4%*	153.4	*38.3%*	20.0	*5.0%*	400.4	380.4
1998	117.2	*32.5%*	82.2	*22.8%*	137.4	*38.1%*	24.2	*6.7%*	361.0	336.8
1999	129.1	*34.4%*	82.7	*22.0%*	141.6	*37.7%*	22.1	*5.9%*	375.5	353.4
2000	136.4	*34.8%*	81.9	*20.9%*	154.1	*39.3%*	19.6	*5.0%*	392.0	372.4
2001	126.4	*35.1%*	77.3	*21.5%*	133.8	*37.2%*	22.6	*6.3%*	360.1	337.5
2002	138.3	*36.0%*	86.5	*22.5%*	138.8	*36.1%*	20.7	*5.4%*	384.3	363.6
2003	143.1	*36.3%*	88.0	*22.3%*	138.6	*35.2%*	24.3	*6.2%*	394.0	369.7
2004	135.7	*35.6%*	82.6	*21.6%*	141.9	*37.2%*	21.4	*5.6%*	381.6	360.2
2005	132.9	*32.2%*	87.5	*21.2%*	132.3	*32.1%*	59.4	*14.4%*	412.1	352.7
2006	121.9	*32.6%*	87.4	*23.4%*	119.7	*32.0%*	44.5	*11.9%*	373.5	329.0
2007[r]	133.0	*33.2%*	90.3	*22.5%*	122.8	*30.6%*	54.9	*13.7%*	401.1	346.1
2008[p]	**142.6**	***34.7%***	**98.5**	***23.9%***	**128.6**	***31.3%***	**41.7**	***10.1%***	**411.4**	**369.7**

a Includes sales to government agencies and other public authorities for general or institutional purposes, classified as "other" sales by the American Gas Association.

b Includes gas used in electric power generation by utilities and independent power producers.

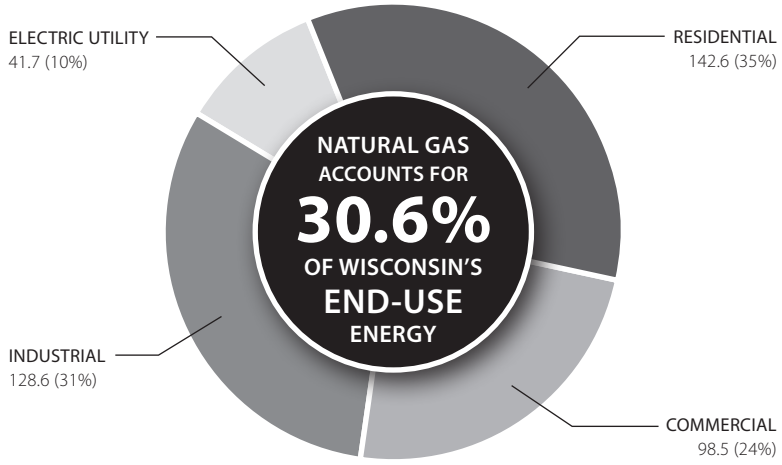
p Preliminary estimates.

r Revised using final annual data from the federal Energy Information Administration.

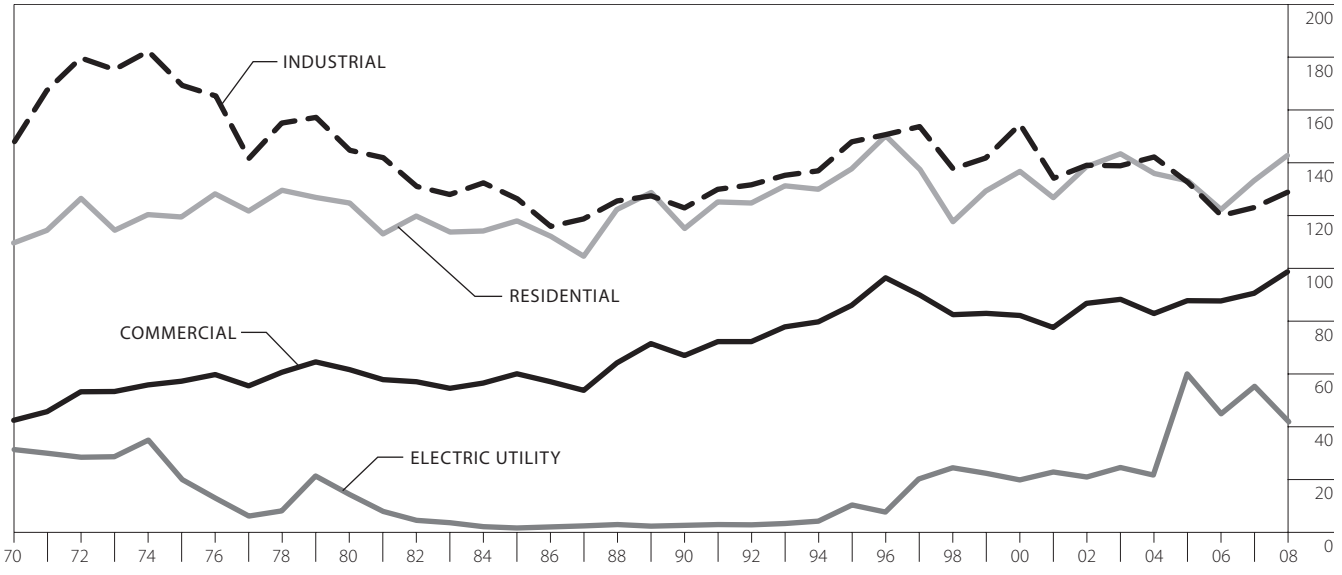
Source: American Gas Association, *Gas Facts* (1961-1997); Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1963-1989), Public Service Commission of Wisconsin, *Operating Revenue and Expense Statistics; Class A and B Utilities in Wisconsin* (1990-1993), form PSC-AF 2 *Gas Sales and Sales Ratio* (1994-2007) and discussions with Public Service Commission staff; U.S. Department of Energy, *Natural Gas Annual, 1991-2007* [DOE/EIA-0131(07)] (January 2009) and *Natural Gas Monthly* [DOE/EIA-0130 (2009/06)] (June 2009).

Wisconsin Natural Gas Use, by Economic Sector

2008 TRILLIONS OF BTU AND PERCENT OF TOTAL



1970-2008 TRILLIONS OF BTU



Source: Wisconsin Office of Energy Independence.

Wisconsin Natural Gas Sales, by Public Service Commission of Wisconsin Sector

In 2008, natural gas use for residential and non residential space heating increased. Because of its lower cost, transport gas continues to be the preferred method of purchasing gas by large commercial and industrial users. These large users purchase the gas directly from the producers and have the interstate pipelines and local distribution companies transport this gas through their pipeline system for a fee.

Figures on this page do not match figures on page 44 due to different data sources. Data presented here are derived from natural gas utility annual reports submitted to the Public Service Commission of Wisconsin. Data collected by the federal Energy Information Administration and the PSCW differ in methodology used to account for natural gas used by a utility for electric generation, resulting in a difference in statewide gas consumption.

Firm natural gas service guarantees no interruptions while *interruptible* service permits interruption on short notice, generally in peak-load seasons. Natural gas classified under "general" is used for applications other than heating, such as running gas appliances like a stove, dryer or water heater.

1970-2008 TRILLIONS OF BTU

	Residential		Commercial, Industrial & Electric			Total to Ultimate Utility Customers	Commercial, Industrial and Electric Transport Gas	Total Sold and Used[d,e]
Year	General	Heating	Firm[a]	Interruptible[b]	Heating			
1970	7.6	101.3	27.4	121.9	47.6	324.0	0.0	324.7
1975	6.8	112.4	36.6	135.2	60.6	362.9	0.0	363.7
1980	4.8	119.4	51.9	94.6	67.7	343.5	0.0	344.1
1985	2.8	115.1	35.3	85.3	67.1	306.7	0.0	307.3
1990	2.1	111.9	18.4	33.3	61.2	228.4	75.1	303.5
1995	1.8	135.7	20.4	50.8	79.2	287.9	93.2	381.1
1996	1.9	147.9	20.1	39.5	87.6	297.0	106.7	403.7
1997	1.8	137.3	12.9	32.5	79.3	263.8	138.4	402.2
1998	1.6	115.6	8.9	25.9	67.7	219.7	141.3	361.0
1999	1.6	127.5	9.7	24.6	71.0	234.4	141.1	375.5
2000	1.6	134.7	6.4	24.1	77.3	244.1	147.9	392.0
2001	1.4	125.0	7.0	23.4	70.0	226.8	133.3	360.1
2002	1.4	136.9	9.1	25.4	73.3	246.1	138.2	384.3
2003	1.5	141.6	9.9	25.3	79.6	257.9	136.1	394.0
2004	1.5	134.3	10.1	24.0	73.5	243.4	138.2	381.6
2005[r]	1.6	131.6	10.2	25.1	75.3	243.9	158.4	402.3
2006[r]	1.6	119.6	8.1	16.2	71.5	217.0	157.7	374.7
2007[p]	1.8	130.5	8.4	17.6	76.4	234.7	159.7	394.4
2008[p]	**2.0**	**139.9**	**10.2**	**14.2**	**83.9**	**250.2**	**157.7**	**407.9**

a Firm service guarantees no interruptions.

b Interruptible service permits interruption on short notice, generally in peak-load seasons.

d Includes gas used by the gas utility and transport gas.

e Totals given here may differ from other tables due to different sources.

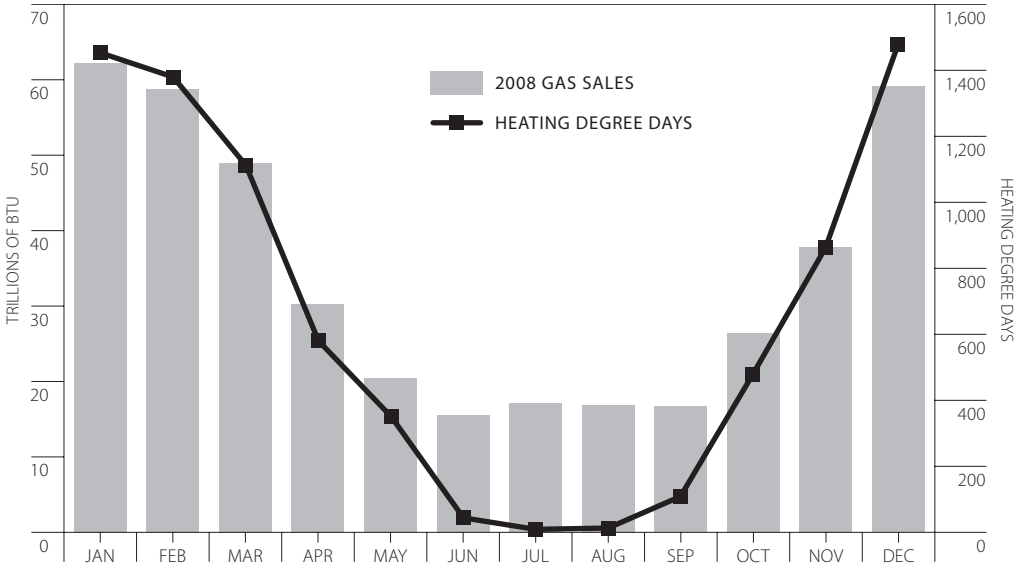
p Preliminary estimates.

r Revised

Source: Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1963-1989), *Operating Revenue and Expense Statistics; Class A and B Utilities in Wisconsin* (1990-1993), and form PSC-AF 2 (1994-2008; U.S. Department of Energy, *Natural Gas Annual, 1991-2008* [DOE/EIA-0131(07)] (January 2009), and *Natural Gas Monthly* [DOE/EIA-0130 (2009/06)] (June 2009).

Wisconsin Natural Gas Sales, by Month

2008 GAS SALES AND HEATING DEGREE DAYS



1976-2008 TRILLIONS OF BTU

Month	1976	1980	1985	1990	1995	2000	2005	2006	2007	2008
January	50.9	52.8	51.3	40.6	52.7	60.1	60.2	44.9	54.3	62.2
February	40.3	47.3	42.3	39.3	48.7	47.1	45.7	49.3	61.5	58.8
March	38.5	42.9	32.2	34.3	39.1	37.7	48.3	42.2	41.1	49.0
April	26.5	27.4	21.2	25.2	32.9	32.0	28.8	23.6	32.4	30.3
May	22.3	17.6	14.4	18.9	20.0	21.6	22.8	19.8	19.1	20.5
June	16.0	14.1	11.2	12.7	15.5	15.9	21.2	18.5	16.0	15.6
July	14.6	13.4	11.1	11.5	15.2	15.6	20.2	17.7	17.7	17.1
August	15.8	13.5	11.7	12.8	17.6	18.0	21.0	18.4	20.3	16.9
September	16.3	14.8	13.1	14.1	16.9	17.6	18.4	17.6	17.3	16.7
October	27.4	25.9	18.7	22.7	25.2	24.2	24.0	31.2	25.1	26.4
November	38.9	32.2	31.2	30.3	44.7	40.6	35.8	35.6	37.4	37.8
December	51.3	46.3	48.6	44.3	54.5	63.7	55.1	45.0	54.6	59.1
Total[a]	**358.8**	**348.2**	**306.9**	**306.9**	**383.0**	**394.1**	**401.5**	**363.8**	**396.8**	**410.4**

a Totals given here may differ from other tables due to different sources.

Source: Wisconsin natural gas utility monthly reports submitted to the Public Service Commission of Wisconsin (1976-2008).

NATURAL GAS
3.4%

In 2008, cold weather during the winter heating season months led to a 3.4 percent increase in natural gas use compared to the 2007. Sales of natural gas are directly related to the number of Heating Degree Days (HDD). For more information on HDDs and Cooling Degree Days (CDD), see pages 139-144 of this publication.

Average Number of Natural Gas Customers in Wisconsin, by Public Service Commission of Wisconsin Sector

16,597
NEW CUSTOMERS

Wisconsin gas utilities added 16,597 new customers in 2008.

These data were historically revised beginning in 2005 to reflect annual reports submitted by Wisconsin Gas utilities to the Public Service Commission of Wisconsin. All customer numbers are annual averages.

Firm natural gas service guarantees no interruptions while *interruptible* service permits interruption on short notice, generally in peak-load seasons. Natural gas classified under "general" is used for applications other than heating, such as running gas appliances like a stove, dryer or water heater. *Transport* gas is gas piped through utility pipelines, but paid for through a direct contract between an industrial user and the natural gas pipeline company.

1970-2008

	Residential		Commercial, Industrial & Electric				
Year	General	Space Heating	Firm	Interruptible	Space Heating	Transport Gas	Total
1970	183,695	566,676	13,806	3,104	50,783		818,064
1975	157,684	700,766	11,685	3,716	65,666		939,517
1980	119,492	830,709	10,781	1,478	76,673		1,039,133
1985	90,433	920,308	8,599	1,935	86,978		1,108,253
1990	77,687	1,041,103	8,193	1,394	102,336		1,230,713
1995	61,900	1,229,524	7,722	1,426	122,276		1,422,848
1996	61,000	1,263,570	7,215	1,339	125,650		1,458,774
1997	59,300	1,302,048	6,933	1,426	129,500		1,499,207
1998	58,000	1,332,068	7,180	1,273	133,000		1,531,521
1999	56,000	1,370,909	7,200	1,140	137,246		1,572,495
2000	54,700	1,403,301	7,100	1,021	139,000		1,605,122
2001	51,500	1,433,036	7,500	1,240	142,848		1,636,124
2002	49,200	1,465,500	8,200	1,370	147,404		1,671,674
2003	48,900	1,492,555	8,290	1,400	148,167		1,699,312
2004	48,300	1,521,419	8,950	1,400	149,500		1,729,569
2005[r]	51,401	1,550,279	8,908	632	152,805	2,448	1,766,473
2006[r]	51,616	1,564,178	8,734	503	154,093	2,341	1,781,465
2007[r]	52,069	1,579,349	8,818	489	156,234	2,296	1,799,255
2008[p]	**52,066**	**1,593,676**	**8,974**	**492**	**158,290**	**2,354**	**1,815,852**

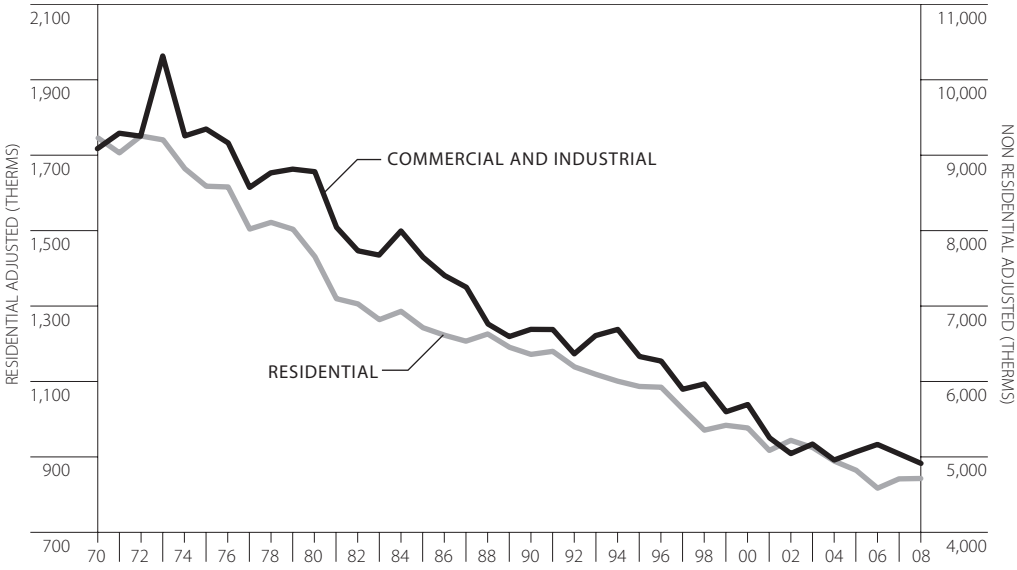
r Revised.

p Preliminary estimates.

Source: Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1963-1989), *Operating Revenue and Expense Statistics; Class A and B Utilities in Wisconsin* (1990-1993), and form PSC-AF 2 *Gas Sales and Sales Ratio (1994-2004);* U.S. Department of Energy, *Natural Gas Annual, 1991-2008* [DOE/EIA-0131(07)] (January 2009); *Sales of Gas by Rate Schedule*, Wisconsin Gas utility annual reports (2005-2008) at http://psc.wi.gov/apps/annlreport/content/munilist.aspx.

Wisconsin Natural Gas Sales Per Customer, by Public Service Commission of Wisconsin Sector

1970-2008 THERMS PER CUSTOMER



	Residential			Commercial, Industrial & Electric			
		Space Heating				Space Heating	
Year	General	Actual	Adjusted[a]	Firm	Interruptible	Actual	Adjusted[a]
1970[r]	412	1,788	1,744	19,852	393,886	9,377	9,079
1975[r]	432	1,603	1,616	31,297	364,846	9,234	9,337
1980[r]	406	1,437	1,430	48,158	644,076	8,829	8,773
1985[r]	311	1,250	1,241	41,035	442,442	7,712	7,641
1990[r]	274	1,075	1,170	22,429	240,166	5,976	6,682
1995[r]	291	1,104	1,085	26,418	356,241	6,477	6,323
2000[r]	293	960	975	9,014	236,043	5,561	5,684
2001[r]	272	872	915	9,333	188,710	4,900	5,246
2002[r]	285	934	942	11,098	185,401	4,973	5,034
2003[r]	307	949	923	11,942	180,714	5,372	5,160
2004[r]	311	883	887	11,285	171,429	4,916	4,949
2005[r]	315	849	863	11,430	397,687	4,928	5,056
2006[r]	310	765	815	9,242	321,600	4,642	5,156
2007[r]	349	827	840	9,517	359,106	4,892	5,031
2008[p]	**389**	**878**	**841**	**11,342**	**287,761**	**5,302**	**4,906**

a Space heating categories adjusted to reflect demand under average heating degree days. In the residential category, an estimate of non-space heating gas use (general) was subtracted from each annual figure before adjusting. In the commercial category, the space heating use was adjusted without a non-space heating adjustment.

r Revised.

p Preliminary estimates.

Source: Public Service Commission of Wisconsin, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1963-1989), *Operating Revenue and Expense Statistics; Class A and B Utilities in Wisconsin* (1991-1993), and form PSC-AF 2 (1994-2008).

NATURAL GAS
0.1%

Natural gas use for residential space heating, adjusted for weather conditions, increased 0.1 percent in 2008. Figures in this table were revised to include updated weather-correction methodology.

Wisconsin Natural Gas Deliveries, by Pipeline Company

The major supplier of natural gas to Wisconsin, ANR, transports most of its gas from Oklahoma and Louisiana. Northern Natural Gas Company transports its gas to Wisconsin from Texas, Oklahoma, Kansas and Alberta, Canada. Natural Gas Pipeline Company transports gas to Wisconsin primarily from Oklahoma, Louisiana and Texas. However, Viking Gas Transmission Company's gas originates primarily from Alberta, Canada. Guardian Pipeline began transporting natural gas to Wisconsin on December 7, 2002.

1970-2008 TRILLIONS OF BTU AND PERCENT OF TOTAL

Year	ANR Pipeline Co.[a]		Viking Gas Trans. Co.[b]		Natural Gas Pipeline Co.[c]		Northern Natural Gas Co.		Guardian Pipeline		Total[e,f]
1970	289.4	*88.2%*	6.0	*1.8%*	6.3	*1.9%*	26.6	*8.1%*	d		328.3
1975	323.0	*88.5%*	5.7	*1.6%*	7.1	*1.9%*	29.2	*8.0%*	d		365.0
1980	305.5	*88.8%*	3.9	*1.1%*	7.8	*2.3%*	26.8	*7.8%*	d		344.0
1985	265.8	*87.4%*	1.2	*0.4%*	7.7	*2.5%*	29.4	*9.7%*	d		304.1
1990	218.2	*72.0%*	6.0	*2.0%*	7.4	*2.4%*	53.8	*17.7%*	d		303.2
1995	264.3	*69.6%*	9.1	*2.4%*	23.5	*6.2%*	83.1	*21.9%*	d		380.0
1996	269.5	*67.7%*	9.9	*2.5%*	26.1	*6.6%*	92.3	*23.2%*	d		397.8
1997	265.8	*68.1%*	10.4	*2.7%*	23.1	*5.9%*	90.8	*23.3%*	d		390.1
1998	241.0	*67.6%*	10.2	*2.9%*	19.7	*5.5%*	85.5	*24.0%*	d		356.4
1999	256.3	*68.8%*	11.4	*3.1%*	16.3	*4.4%*	88.3	*23.7%*	d		372.3
2000	272.1	*69.0%*	11.1	*2.8%*	21.0	*5.3%*	90.0	*22.8%*	d		394.2
2001	236.4	*66.0%*	14.1	*3.9%*	23.7	*6.6%*	84.1	*23.5%*	d		358.3
2002	267.2	*68.7%*	15.1	*3.9%*	22.3	*5.7%*	82.5	*21.2%*	1.9	*0.5%*	389.0
2003	257.0	*64.6%*	16.0	*4.0%*	19.9	*5.0%*	84.8	*21.3%*	20.3	*5.1%*	398.0
2004	241.8	*60.5%*	14.8	*3.7%*	19.8	*5.0%*	82.3	*20.6%*	40.8	*10.2%*	399.5
2005	253.2	*61.2%*	16.1	*3.9%*	19.6	*4.7%*	82.3	*19.9%*	42.9	*10.4%*	414.0
2006	219.0	*57.5%*	14.6	*3.8%*	19.9	*5.2%*	86.8	*22.8%*	40.6	*10.7%*	380.9
2007	249.9	*59.2%*	18.8	*4.4%*	18.0	*4.3%*	86.5	*20.5%*	48.9	*11.6%*	422.1
2008[p]	**258.3**	***58.6%***	**17.9**	***4.1%***	**17.5**	***4.0%***	**93.0**	***21.1%***	**53.9**	***12.2%***	**440.6**

a Formerly American Natural Resources Pipeline Co.

b Formerly Midwest Gas Transmission Co.

c In 1994, Midcon Corporation became part of the Natural Gas Pipeline Co. Prior to 1994, data in this table included delivery information from Midcon Corporation.

d The Guardian Pipeline became operational on December 7, 2002.

e Total purchases differ from the total sold and used by gas utilities due to inventory changes, utility production from liquefied petroleum gas and some unaccounted gas.

f Prior to 1990, deliveries represent utility gas sales. Beginning in 1990, deliveries represent total gas used in Wisconsin, including both utility and transported gas deliveries.

p Preliminary.

Source: Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1970-1993). Telephone conversations with pipeline representatives 1991-2008.

Wisconsin Coal Use, in Btu, by Economic Sector

1970-2008 TRILLIONS OF BTU AND PERCENT OF TOTAL

Year	Residential		Commercial		Industrial		Electric Utility[a]		Total	Total End Use
1970	9.5	*2.7%*	17.7	*5.0%*	97.1	*27.3%*	231.1	*65.0%*	355.4	124.3
1975	3.8	*1.4%*	7.1	*2.7%*	40.9	*15.6%*	210.5	*80.3%*	262.3	51.8
1980	2.3	*0.7%*	4.4	*1.4%*	47.2	*14.5%*	270.7	*83.4%*	324.6	53.9
1985	0.9	*0.2%*	4.4	*1.2%*	51.4	*13.7%*	317.7	*84.9%*	374.4	56.7
1990	0.4	*0.1%*	4.5	*1.1%*	51.9	*12.6%*	354.5	*86.2%*	411.4	56.9
1995	0.3	*0.1%*	3.8	*0.8%*	47.2	*10.2%*	412.4	*88.9%*	463.7	51.3
1996	0.3	*0.1%*	4.6	*0.9%*	43.1	*8.9%*	438.8	*90.1%*	486.9	48.1
1997	0.3	*0.1%*	4.6	*0.9%*	43.2	*8.5%*	462.0	*90.6%*	510.1	48.1
1998	0.3	*0.1%*	4.8	*1.0%*	41.9	*8.4%*	448.9	*90.5%*	495.8	46.9
1999	0.2	*0.0%*	5.0	*1.0%*	40.7	*8.1%*	459.6	*90.9%*	505.5	45.9
2000	0.2	*0.0%*	4.8	*0.9%*	43.0	*8.3%*	471.4	*90.8%*	519.4	48.0
2001	0.2	*0.0%*	4.8	*0.9%*	45.3	*8.7%*	471.6	*90.4%*	521.9	50.3
2002	0.2	*0.0%*	4.5	*0.9%*	46.7	*9.2%*	457.1	*89.9%*	508.5	51.3
2003	0.2	*0.0%*	4.7	*0.9%*	45.6	*8.7%*	476.6	*90.4%*	527.0	50.5
2004	0.1	*0.0%*	4.8	*0.9%*	47.0	*8.7%*	485.2	*90.3%*	537.0	51.9
2005	0.1	*0.0%*	4.8	*0.9%*	45.1	*8.5%*	481.7	*90.6%*	531.7	50.0
2006	0.1	*0.0%*	4.8	*0.9%*	46.7	*9.0%*	464.1	*90.0%*	515.7	51.6
2007[r]	0.1	*0.0%*	3.9	*0.8%*	46.5	*9.0%*	465.4	*90.2%*	515.9	50.5
2008[p]	**0.0**	***0.0%***	**2.5**	***0.5%***	**45.1**	***8.4%***	**489.7**	***91.1%***	**537.3**	**47.6**

a Includes petroleum coke co-fired with coal.

p Preliminary estimates.

r Revised.

Source: U.S. Department of Energy, Energy Information Administration, *State Energy Data Report*, [DOE/EIA-0214(94)] (October 1996), and *Coal Distribution* [DOE/EIA-0125 (95/4Q)] (1980-1995); Wisconsin Department of Natural Resources, Annual Survey of Point Source Emissions, unpublished (1971-2008); annual reports of various Wisconsin electric generating utilities (1995-2008); U.S. Department of Commerce, Bureau of the Census of Housing (1970, 1980, 1990 and 2000).

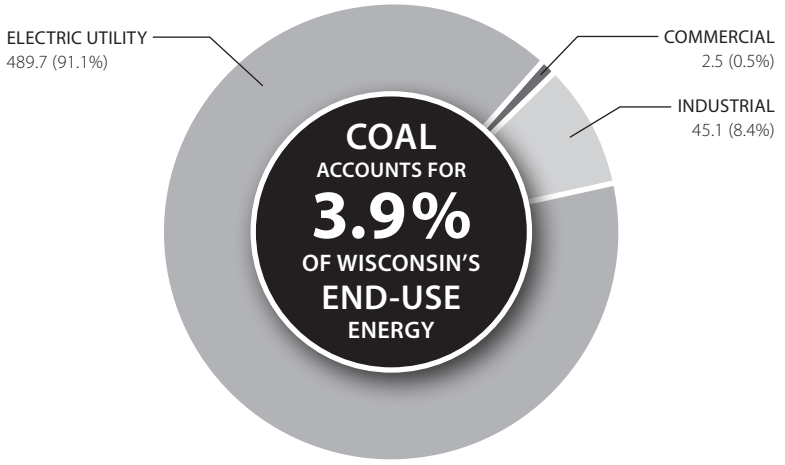
COAL CONSUMPTION 4.2%

Wisconsin's total coal consumption increased 4.2 percent in 2008. All increases in coal use happened in the electric sector because the Weston 4 coal plant came online during 2008.

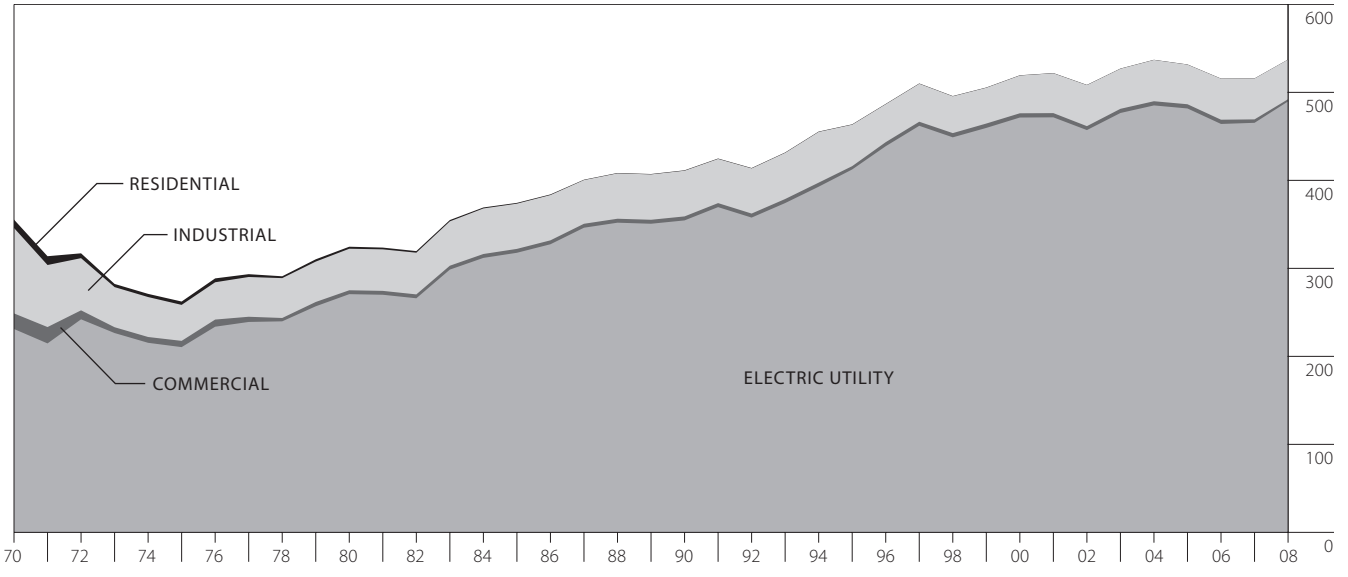
Wisconsin coal use has more than doubled since 1975. Industrial coal consumption decreased 3.0 percent in 2008. Commercial sector use of coal is limited primarily to state facilities and large institutions, and decreased by 35.9 percent. Residential coal use is limited to fewer than 300 residences and some older residential facilities, such as apartments.

Wisconsin Coal Use, by Economic Sector

2008 TRILLIONS OF BTU AND PERCENT OF TOTAL



1970-2008 TRILLIONS OF BTU



Source: Wisconsin Office of Energy Independence.

Wisconsin Coal Use, in Tons, by Economic Sector

1970-2008 THOUSANDS OF TONS AND PERCENT OF TOTAL

Year	Residential		Commercial		Industrial		Electric Utility[a]		Total
1970	453	*2.9%*	840	*5.4%*	3,870	*25.0%*	10,294	*66.6%*	15,457
1975	202	*1.7%*	375	*3.1%*	1,716	*14.2%*	9,776	*81.0%*	12,069
1980	113	*0.7%*	210	*1.3%*	2,001	*12.5%*	13,715	*85.5%*	16,039
1985	40	*0.2%*	211	*1.1%*	2,176	*11.7%*	16,208	*87.0%*	18,635
1990	20	*0.1%*	216	*1.1%*	2,200	*10.7%*	18,087	*88.1%*	20,523
1995	15	*0.1%*	179	*0.8%*	1,998	*8.6%*	21,042	*90.6%*	23,234
1996	14	*0.1%*	220	*0.9%*	1,827	*7.5%*	22,386	*91.6%*	24,447
1997	13	*0.1%*	220	*0.9%*	1,830	*7.1%*	23,571	*92.0%*	25,634
1998	12	*0.0%*	228	*0.9%*	1,773	*7.1%*	22,904	*91.9%*	24,917
1999	11	*0.0%*	237	*0.9%*	1,724	*6.8%*	23,450	*92.2%*	25,422
2000	10	*0.0%*	230	*0.9%*	1,820	*7.0%*	24,050	*92.1%*	26,110
2001	9	*0.0%*	229	*0.9%*	1,919	*7.3%*	24,062	*91.8%*	26,219
2002	8	*0.0%*	213	*0.8%*	1,978	*7.8%*	23,323	*91.4%*	25,522
2003	7	*0.0%*	226	*0.9%*	1,931	*7.3%*	24,314	*91.8%*	26,478
2004	6	*0.0%*	227	*0.8%*	1,989	*7.4%*	24,753	*91.8%*	26,975
2005	5	*0.0%*	228	*0.9%*	1,911	*7.2%*	24,577	*92.0%*	26,721
2006	4	*0.0%*	230	*0.9%*	1,976	*7.6%*	23,679	*91.5%*	25,889
2007[r]	3	*0.0%*	185	*0.7%*	1,972	*7.6%*	23,745	*91.7%*	25,905
2008[p]	**2**	***0.0%***	**120**	***0.4%***	**1,910**	***7.1%***	**24,983**	***92.5%***	**27,015**

COAL
USE INCREASED
1,110
THOUSAND TONS

The total weight of coal used in Wisconsin increased 1,110 thousand tons (4.3 percent) in 2008.

a Includes petroleum coke co-fired with coal.

p Preliminary estimates.

r Revised.

Source: U.S. Department of Energy, Energy Information Administration, *State Energy Data Report* [DOE/EIA-0214(94)] (October 1996); U.S. Department of Commerce, Bureau of Census, *Census of Manufacturers* and *Annual Survey of Manufacturers, Fuels and Electric Energy Consumed* (1971-1982); Wisconsin Department of Natural Resources, Annual Survey of Point Source Emissions, unpublished (1971-2008); annual reports of various Wisconsin electric generating utilities (1995-2008); U.S. Department of Commerce, Bureau of the Census of Housing (1970, 1980, 1990 and 2000); http//www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html..

Wisconsin Electric Utility Coal Use, by Plant

COAL USE BY ELECTRIC UTILITIES 5.2%

Coal use by Wisconsin's electric utilities increased 5.2 percent in 2008. The two largest power plants, Pleasant Prairie and Columbia, used 40 percent of the utility coal burned in Wisconsin, while Wisconsin's newest coal plant, Weston 4 (Wisconsin Public Service) is responsible for most of the increased coal consumption.

A map of Wisconsin's Coal Transportation Routes and Major Coal Plants can be found in the Map Appendix on page 151.

1975-2008 THOUSANDS OF TONS

Utility / Plant Name	1975	1980	1985	1990	1995	2000	2005	2006	2007	2008
Dairyland Power Cooperative										
Alma	502	1,188	1,268	1,506	1,231	1,754	2,031	1,950	2,019	2,010
Genoa	801	915	914	680	788	928	1,172	1,162	1,083	1,172
Stoneman	111	74	44	30	0	0	38	23	36	30
Madison Gas and Electric Co.										
Blount Street	77	144	61	95	137	215	228	103	106	107
Northern States Power Co.										
Bay Front	52	100	36	45	30	115	152	96	140	127
Wisconsin Public Service Corp.										
Pulliam	753	744	489	674	1,130	1,444	1,627	1,620	1,617	1,361
Weston	239	329	1,275	1,555	1,702	1,972	2,143	2,044	1,712	2,834
Wisconsin Electric Power Co.										
Oak Creek	2,873	2,542	2,528	1,522	2,093	3,410	3,255	3,287	3,238	3,371
Pleasant Prairie	0	581	2,564	4,703	5,073	5,295	5,373	4,737	4,963	4,973
Port Washington	691	683	348	126	430	641	0	0	0	0
Valley	536	774	528	463	458	690	780	805	792	684
Wisconsin Power and Light Co.										
Blackhawk	24	30	8	0	0	0	0	0	0	0
Columbia	1,025	3,603	2,991	3,665	4,238	4,355	4,274	4,326	4,541	4,563
Edgewater	976	1,056	2,112	2,180	2,702	2,531	2,533	2,400	2,810	2,810
Nelson Dewey	512	552	541	497	615	580	729	727	657	642
Rock River	293	245	317	198	253	2	0	0	0	0
Municipal Utilities										
Manitowoc[a]	142	67	91	116	160	108	140	105	77	239
Marshfield	90	40	48	7	0	0	0	0	0	0
Menasha	58	28	25	25	2	10	6	63	110	100
Richland Center	21	20	20	0	0	0	0	0	0	0
Total[b]	**9,776**	**13,715**	**16,208**	**18,087**	**21,042**	**24,050**	**24,577**	**23,679**	**23,745**	**24,983**

a Includes petroleum coke co-fired with coal.

b The totals do not always match the sum of the individual plants in this table. The totals are drawn from the federal Energy Information Administration, while the plant-specific data comes from the Wisconsin Department of Natural Resources emissions data.

Source: Wisconsin Department of Natural Resources, Annual Survey of Point Source Emissions, unpublished (1975-2008); annual reports of various Wisconsin electric generating utilities (1995-2008); U.S. Department of Energy, *Electric Power Monthly* [DOE/EIA-0226 (2009/03)](March 2009).

Wisconsin Manufacturing Industry Coal Purchases, by Industry Group

1971-2008 THOUSANDS OF TONS

SIC Industry Group	1971	1975	1980	1985	1990	1995[r]	2000[r]	2005[r]	2006[r]	2007[r]	2008[b]
20 Food and Kindred	213	56	64	72	43	10	15	21	21	22	20
24 Lumber	17	3	2	2	—	—	—	—	—	—	—
25 Furniture	2	—[a]	—	—	—	—	—	—	—	—	—
26 Paper and Allied	1,940	1,469	1,737	1,878	1,863	1,825	1,700	1,765	1,833	1,838	1,785
28 Chemicals	174	6	—	—	—	—	—	—	—	—	—
30 Rubber	48	39	31	27	22	—	—	—	—	—	—
31 Leather	3	1	2	—	—	—	—	—	—	—	—
32 Stone, Clay and Glass	79	13	8	49	116	120	80	121	116	108	103
33 Primary Metals	114	50	80	66	95	—	—	—	—	—	—
34 Fabricated Metals	27	—	—	—	—	—	—	—	—	—	—
35 Machinery	67	31	38	37	23	14	—	—	—	—	—
36 Electrical Equipment	17	1	—	—	—	—	—	—	—	—	—
37 Transport Equipment	107	35	30	37	32	22	12	4	6	4	2
39 Miscellaneous	3	2	8	8	6	8	—	—	—	—	—
Total Manufacturing	**2,810**	**1,716**	**2,001**	**2,176**	**2,200**	**1,998**	**1,820**	**1,911**	**1,976**	**1,972**	**1,910**

PAPER & ALLIED PRODUCTS
93.5%

Wisconsin's industrial coal use continues to be dominated by paper and allied products, which consumed 93.5 percent of the industrial coal used in 2008.

a Fewer than 500 tons.

b Estimated.

r Revised.

Source: U.S. Department of Commerce, Bureau of the Census, *Census of Manufacturers, and Annual Survey of Manufacturers* (1972-1981); U.S. Department of Energy, Energy Information Administration, *Coal Distribution* [DOE/EIA-0125 (95/4Q)] (1980-1995); Wisconsin Department of Natural Resources, Annual Survey of Point Source Emissions, unpublished (1972-2008).

Coal Deliveries to Wisconsin, by Transportation Mode and Type of Receiving Facility

COAL SHIPPED BY RAIL 0.6%

Coal shipped by rail decreased 0.6 percent in 2008 as total coal deliveries decreased 0.7 percent. Nearly 95 percent of coal is delivered to Wisconsin by rail. The long term increase in coal tonnage shipped by rail reflects the increased use of low sulfur western coal. Use of low sulfur eastern coal shipped by the Great Lakes, and midwest coal shipped by river barge, is expected to continue at near current levels. Changes in Wisconsin coal deliveries will be concentrated in rail deliveries of western coal for electric utilities.

1975-2008 THOUSANDS OF TONS

Transportation Mode and Type of Receiving Facility	1975	1980	1985	1990	1995	2000	2005	2007	2008[p]
Rail									
Electric Utilities	7,631	11,140	13,194	17,237	18,815	25,072	21,722	24,063	23,955
Coke Plants	29	11	0	0	0	0	0	0	0
Other Industrial	850	1,047	846	811	772	1,169	1,177	1,377	1,330
Residential/Commercial	170	3	5	1	3	33	417	56	50
Subtotal	**8,680**	**12,201**	**14,045**	**18,049**	**19,590**	**26,274**	**23,316**	**25,496**	**25,335**
Great Lakes Shipping									
Electric Utilities	2,211	1,713	1,118	429	1,005	753	1,572	518	500
Coke Plants	224	167	0	0	0	0	0	0	0
Other Industrial	992	981	1,024	822	788	331	46	39	40
Residential/Commercial	212	46	11	1	0	0	0	0	0
Subtotal	**3,639**	**2,907**	**2,153**	**1,252**	**1,793**	**1,084**	**1,618**	**557**	**540**
River Barge									
Electric Utilities	1,756	1,487	1,042	855	1,083	32	1,508	454	450
Other Industrial	0	62	246	55	120	4	22	18	20
Residential/Commercial	0	1	10	2	126	129	0	0	0
Subtotal	**1,756**	**1,550**	**1,298**	**912**	**1,329**	**165**	**1,530**	**472**	**470**
Truck									
Electric Utilities	0	0	2	31	0	0	0	50	50
Other Industrial	0	1	45	1	53	5	488	355	340
Residential/Commercial	0	0	0	0	0	0	1	0	0
Subtotal	**0**	**1**	**47**	**32**	**53**	**5**	**489**	**405**	**390**
Total[a]	**14,075**	**16,658**	**17,544**	**20,245**	**22,766**	**27,528**	**26,953**	**26,930**	**26,735**

a Total data reported in this table may differ from other tables because of different sources.

p Preliminary

Source: U.S. Bureau of Mines, "Bituminous Coal and Lignite Distribution", *Mineral Industry Surveys* (1973-1976); U.S. Department of Energy, Energy Information Administration, *Bituminous and Subbituminous Coal and Lignite Distribution* (1977-1979), *Coal Industry Annual* [DOE/EIA - 0584] (2000), *Coal Distribution* [DOE/EIA-0125 (99/4Q)] (1980-1999) and *Quarterly Coal Report* [DOA/EIA-0121 (2008/4Q)] (March 2009), www.eia.doe.gov/cheaf/coal/quaterly/qcr.pdf and www.eia.doe.gov/cneaf/coal/page/coaldistrib/coal_distributions.html.

Coal Deliveries to Wisconsin Industries, by Region of Origin

1975-2008 THOUSANDS OF TONS

Origin[a]	1975	1980	1985	1990	1995	2000	2005	2006	2007	2008[p]
Eastern PA	39	136	24	4	5	8	137	152	148	140
Western PA	11	125	192	38	33	11	0	0	0	0
Northern WV	93	339	150	230	384	75	175	110	98	73
Ohio	91	129	43	0	10	0	36	18	19	15
Southern No. 1 (WV and VA)	35	88	2	1	15	190	13	4	0	0
Southern No. 2 (WV and KY)	1,210	497	757	628	529	326	243	248	261	255
Western KY	111	127	147	98	196	179	192	193	197	190
Illinois	515	520	624	300	228	147	101	107	106	100
Indiana	55	114	89	43	67	52	207	202	215	200
Western U.S.	11	3	0	0	0	0	0	0	0	0
CO and NM	0	0	0	0	0	0	190	326	322	300
Wyoming	24	16	0	346	250	521	368	424	423	400
Utah	1	0	0	0	0	0	71	27	0	0
MO and WA	281	220	158	0	15	0	0	0	0	0
Total	**2,477**	**2,314**	**2,186**	**1,688**	**1,733**	**1,509**	**1,733**	**1,811**	**1,789**	**1,673**

COAL FROM WESTERN U.S.
41.3%

Coal currently used by Wisconsin industry comes primarily from the western part of the country (41.3 percent). There has been a gradual decline in industrial coal use. Industrial coal from Illinois has declined 83 percent since 1985.

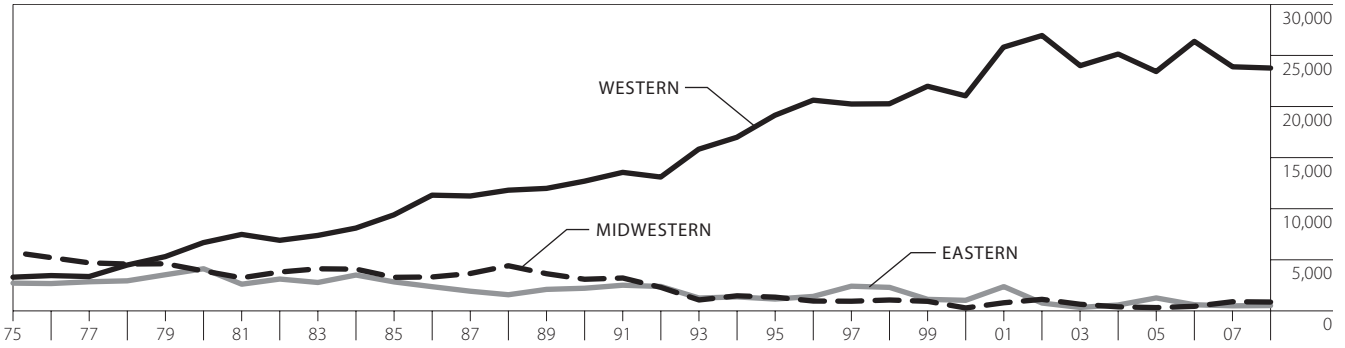
a Includes shipments to Wisconsin end users and dealers. Does not include deliveries to Superior Midwest Energy Terminal for trans-shipment from Wisconsin.

p Preliminary

Source: U.S. Bureau of Mines, "Bituminous Coal and Lignite Distribution", *Mineral Industry Surveys* (1973-1976); U.S. Department of Energy, Energy Information Administration, *Bituminous and Subbituminous Coal and Lignite Distribution* (1977-1979), *Coal Industry Annual* [DOE/EIA-0584](2000), *Coal Distribution* [DOE/EIA-0125 (99/4Q)] (1980-1999), *Quarterly Coal Report* [DOE/EIA - 0121(200374Q)] (March 2009), http://www.eia.doe/gov/cneaf/coal/quarterly/qcr.pdf and http://www.eia.doe.gov/cneaf/coal/page/coaldistrib/coal_distributions.html.

Coal Deliveries to Wisconsin Power Plants, by Region of Origin

1975-2008 THOUSANDS OF TONS



Coal Deliveries to Wisconsin Power Plants, by State of Origin

COAL DELIVERIES 0.5%

Although utility power plant coal use increased 0.4 percent in 2008, coal deliveries to Wisconsin power plants decreased 0.5 percent. This resulted in a decrease of coal stockpiled at Wisconsin utilities for future use.

1975-2008 THOUSANDS OF TONS

State	1975	1980	1985	1990	1995	2000	2005	2006	2007[r]	2008[p]
Eastern										
Kentucky	2,073	2,816	2,122	196	95	47	758	269	179	225
Pennsylvania	572	1,007	639	1,760	941	826	0	3	12	10
West Virginia	5	233	0	136	57	34	252	260	240	220
Other States	1	0	9	59	0	62	191	2	0	0
Subtotal	**2,651**	**4,056**	**2,770**	**2,151**	**1,093**	**969**	**1,201**	**534**	**431**	**455**
Midwestern										
Illinois	4,857	3,364	1,478	1,136	1,232	0	97	297	686	650
Indiana	785	205	1,731	1,893	46	221	159	84	146	150
Ohio	27	272	0	0	0	0	0	0	0	0
Other States	0	1	9	0	0	0	0	0	0	0
Subtotal	**5,669**	**3,842**	**3,218**	**3,029**	**1,278**	**221**	**256**	**381**	**832**	**800**
Western										
Montana	2,161	2,575	2,235	1,983	2,102	463	591	1,237	1,961	1,800
Wyoming	1,053	4,042	7,101	10,605	15,223	19,192	20,581	23,150	19,811	19,950
Other States	20	0	0	43	1,758	1,320	2,174	1,907	2,050	1,950
Subtotal	**3,234**	**6,617**	**9,336**	**12,631**	**19,083**	**20,975**	**23,346**	**26,294**	**23,822**	**23,700**
Total	**11,554**	**14,515**	**15,324**	**17,811**	**21,454**	**22,165**	**24,803**	**27,209**	**25,085**	**24,955**

p Preliminary

r Revised

Source: U.S. Department of Energy, *Cost and Quality of Fuels for Electric Utility Plants 2000* [DOE/EIA-0191(2001)] (May 2001), and *Quarterly Coal Report* [DOE/EIA-0121 (2007/4Q)] (March 2009), http://www.eia.doe/gov/cneaf/coal/quarterly/qcr.pdf and http://www.eia.doe.gov/cneaf/coal/page/coaldistrib/coal_distributions.html.

Wisconsin Electric Utility Sales, by Economic Sector

1970-2008 MILLIONS OF kWh AND PERCENT OF TOTAL

Year	Residential		Commercial[a]		Industrial		Agricultural[c,d]		Total[e]
1970	8,761	*35.4%*	5,738	*23.2%*	9,188	*37.2%*	1,028	*4.2%*	24,715
1975	10,893	*34.8%*	8,452	*27.0%*	10,721	*34.3%*	1,210	*3.9%*	31,276
1980	12,513	*33.2%*	11,243	*29.8%*	12,450	*33.0%*	1,539	*4.1%*	37,745
1985	13,257	*31.8%*	12,783	*30.6%*	13,940	*33.4%*	1,745	*4.2%*	41,725
1990[b]	14,740	*30.0%*	15,808	*32.1%*	17,005	*34.6%*	1,645	*3.3%*	49,198
1995	17,040	*29.4%*	18,042	*31.1%*	21,290	*36.7%*	1,595	*2.8%*	57,967
1996	17,100	*29.1%*	18,588	*31.6%*	21,471	*36.6%*	1,585	*2.7%*	58,744
1997	16,935	*28.2%*	18,881	*31.4%*	22,703	*37.8%*	1,575	*2.6%*	60,094
1998	17,522	*28.2%*	19,334	*31.2%*	23,640	*38.1%*	1,565	*2.5%*	62,061
1999	17,942	*28.2%*	20,781	*32.7%*	23,264	*36.6%*	1,560	*2.5%*	63,547
2000	18,199	*28.1%*	21,407	*33.1%*	23,528	*36.4%*	1,555	*2.4%*	64,689
2001	18,990	*28.8%*	21,614	*32.8%*	23,823	*36.1%*	1,550	*2.3%*	65,977
2002[f]	20,030	*29.9%*	22,290	*33.3%*	23,134	*34.5%*	1,545	*2.3%*	66,999
2003[c]	21,364	*31.8%*	20,056	*29.8%*	24,226	*36.0%*	1,595	*2.4%*	67,241
2004	21,120	*31.2%*	19,951	*29.4%*	25,228	*37.2%*	1,501	*2.2%*	67,800
2005[r]	21,385	*30.4%*	21,968	*31.2%*	25,376	*36.1%*	1,606	*2.3%*	70,335
2006[r]	20,842	*29.9%*	22,230	*31.8%*	25,163	*36.0%*	1,574	*2.3%*	69,809
2007[r]	21,454	*30.1%*	23,032	*32.3%*	25,436	*35.7%*	1,379	*1.9%*	71,301
2008[p]	**20,914**	***29.9%***	**22,855**	***32.6%***	**24,753**	***35.4%***	**1,486**	***2.1%***	**70,008**

TOTAL ELECTRICITY SALES 1.8%

Total electricity sales decreased 1.8 percent in 2008 but have grown 12.8 percent over the past ten years. In 2008, electricity sales decreased in all sectors except agricultural.

A map of Wisconsin's major electric lines and service territory areas can be found in the Map Appendix on page 152.

a Includes sales to public authorities (including sales for street and highway lighting) and utility company interdepartmental sales (for example, from electric to gas department of a combined utility).

b Beginning in 1989, U.S. DOE data sources have been used.

c Beginning in 2003, USDA agricultural statistics were used for electricity sales to this sector. To accommodate this shift in data sources, numbers in the residential and agricultural sectors have been historically revised.

d The agricultural sector does not include processing plants for crops and other agricultural products; these are classified under the commercial sector.

e Total sales may vary from other pages due to independent rounding.

f In 2002, EIA shifted their commercial and industrial criteria. Previous editions of this publication corrected for this shift, but revisions based on availability of firm agricultural electric consumption data prompted a historical revision starting in 1989. This publication no longer corrects for shifts in EIA data collection methods which are reflected in 2003.

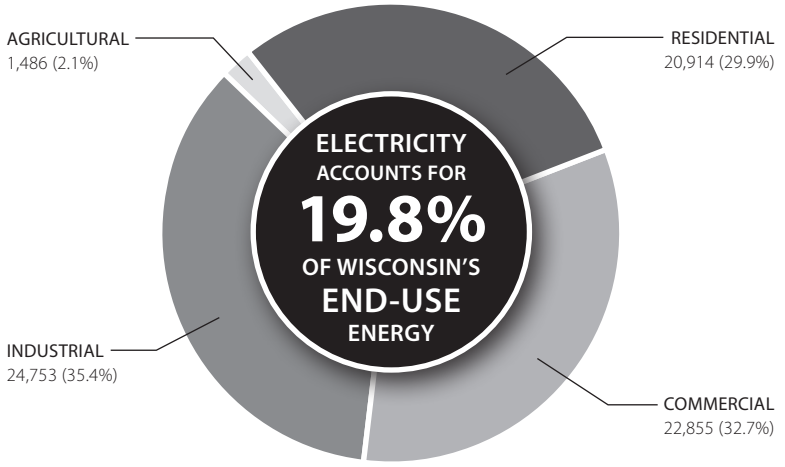
p Preliminary estimates.

r Revised.

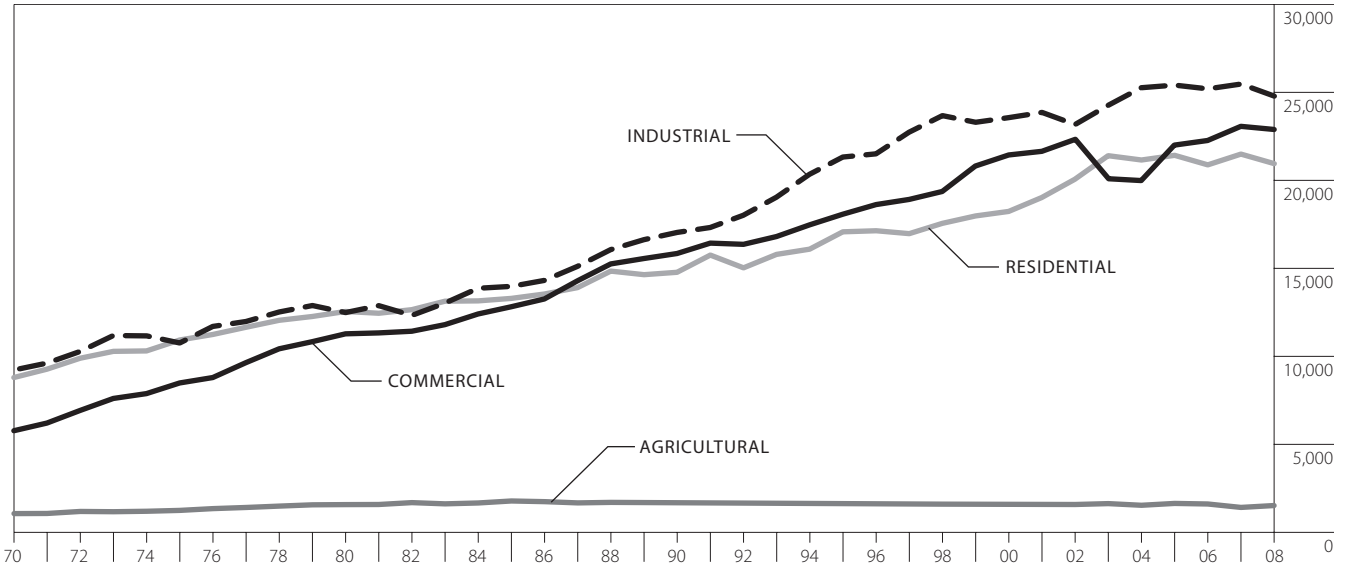
Source: Sectoral disaggregation by Wisconsin Office of Energy Independence, based on Public Service Commission of Wisconsin, *Statistics of Wisconsin Public Utilities*, Bulletin #8 (1970-1994); U.S. Department of Agriculture, Rural Electrification Administration, *Annual Statistical Report*, REA Bulletin 1-1 (1970-1994); U.S. Department of Energy, *Electric Sales and Revenue 1989-1999* [DOE/EIA-0540 (99)] (October 2000), *Electric Power Monthly* [DOE/EIA-0226 (2009/03)] (March 2009) (1989-2008). http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html; U.S. Department of Agriculture, Economic Research Service, electricity expenditure data at http://www.ers.usda.gov/ (2007-2008).

Wisconsin Electric Utility Sales, by Economic Sector

2008 MILLIONS OF kWh AND PERCENT OF TOTAL



1970-2008 MILLIONS OF kWh



Source: Wisconsin Office of Energy Independence.

Wisconsin Electricity Sales to Ultimate Customers, by Private and Municipal Utilities and Power Cooperatives

1970-2008 MILLIONS OF kWh AND PERCENT OF TOTAL

Year	Private Utilities		Municipal Utilities		Power Cooperatives		Total
1970	21,515	*87.1%*	2,160	*8.7%*	1,040	*4.2%*	24,715
1975	27,021	*86.4%*	2,784	*8.9%*	1,471	*4.7%*	31,276
1980	32,335	*85.7%*	3,547	*9.4%*	1,864	*4.9%*	37,746
1985	35,497	*85.1%*	4,132	*9.9%*	2,096	*5.0%*	41,725
1990[a]	41,653	*84.7%*	5,263	*10.7%*	2,282	*4.6%*	49,198
1995	48,814	*84.2%*	6,479	*11.2%*	2,674	*4.6%*	57,967
1996	49,332	*84.0%*	6,635	*11.3%*	2,777	*4.7%*	58,744
1997	50,640	*84.3%*	6,627	*11.0%*	2,827	*4.7%*	60,094
1998	52,242	*84.2%*	6,992	*11.3%*	2,827	*4.6%*	62,061
1999	53,517	*84.2%*	7,215	*11.4%*	2,815	*4.4%*	63,547
2000	54,404	*84.1%*	7,375	*11.4%*	2,910	*4.5%*	64,689
2001	55,545	*84.2%*	7,349	*11.1%*	3,083	*4.7%*	65,977
2002	56,250	*84.0%*	7,523	*11.2%*	3,226	*4.8%*	66,999
2003	56,459	*84.0%*	7,500	*11.2%*	3,282	*4.9%*	67,241
2004	57,099	*84.0%*	7,598	*11.2%*	3,279	*4.8%*	67,976
2005	58,899	*83.7%*	7,950	*11.3%*	3,487	*5.0%*	70,336
2006	58,407	*83.7%*	7,904	*11.3%*	3,510	*5.0%*	69,821
2007	59,585	*83.6%*	8,079	*11.3%*	3,637	*5.1%*	71,301
2008[p]	**58,458**	***83.5%***	**7,900**	***11.3%***	**3,650**	***5.2%***	**70,008**

Investor owned utilities supply the vast majority of power to Wisconsin electricity customers. The relative amounts of power supplied by the three types of suppliers have changed very little over the past 20 years.

a Beginning in 1989, U.S. DOE data sources have been used.

p Preliminary estimates.

Source: Public Service Commission of Wisconsin, Accounts and Finance Division, *Statistics of Wisconsin Public Utilities*, Bulletin #8, Table 5 (1970-1994); U.S. Department of Agriculture, Rural Electrification Administration, *Annual Statistical Report*, REA Bulletin 1-1, Table 31 (1970-1994); U.S. Department of Energy, *Electric Sales and Revenue 1989-2000* [DOE/EIA-0540 (2000)] (November 2001), and *Electric Power Monthly* [DOE/EIA-0226 (2009/03)] (March 2009). www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html

Eastern Wisconsin Electric Utility Power Load and Non-Coincident Peak Demand

SUMMER PEAK DEMAND 5.5%

Wisconsin's 2008 summer peak electricity demand for the eastern Wisconsin utilities decreased 5.5 percent due to milder weather in July. The decrease compared to 2007 was 638 megawatts.

WINTER PEAK DEMAND 2.6%

Winter peak demand increased in 2008 due to colder December weather. Summer peak demand in 2008 exceeded winter peak demand by 1,578 megawatts.

1970-2008

Year	Load (Millions of kWh)	Peak Demand[a,b] Summer (MW)	Peak Demand[a,b] Winter (MW)	Load Factor[c] (Percent)
1970	22,818	4,125	3,964	63.1
1975	28,616	5,314	4,903	61.5
1980	34,836	6,009	5,525	66.0
1985	39,325	6,464	6,166	69.4
1990[d]	47,381	8,326	7,210	65.0
1995	55,821	9,833	8,275	64.8
1996	58,408	9,061	8,285	73.4
1997	59,946	9,313	8,302	73.5
1998	59,563	10,099	8,644	67.3
1999	61,990	10,756	8,977	65.8
2000	64,084	10,814	9,152	67.6
2001	61,701	11,645	8,440	60.5
2002	67,698	11,401	8,917	67.8
2003	68,886	11,688	9,192	67.3
2004	68,296	10,981	9,729	70.8
2005	70,441	11,946	9,595	67.3
2006	67,216	12,129	9,000	63.3
2007[r]	68,796	11,698	9,238	67.1
2008[p]	**66,930**	**11,060**	**9,482**	**69.1**

a Wisconsin Electric Power Co., Wisconsin Power and Light Co., Wisconsin Public Service Corp., and Madison Gas and Electric Co.

b Non-coincident peak demand is the sum of the individual monthly peak electric demands from the four utilities listed above.

c Load Factor = Annual Energy Generation (kWh) / [Peak Demand (kW) x 8,760 (hours/year)]

d Beginning in January 1988, data includes Wisconsin Electric Power Co. generation from Presque Isle, Michigan.

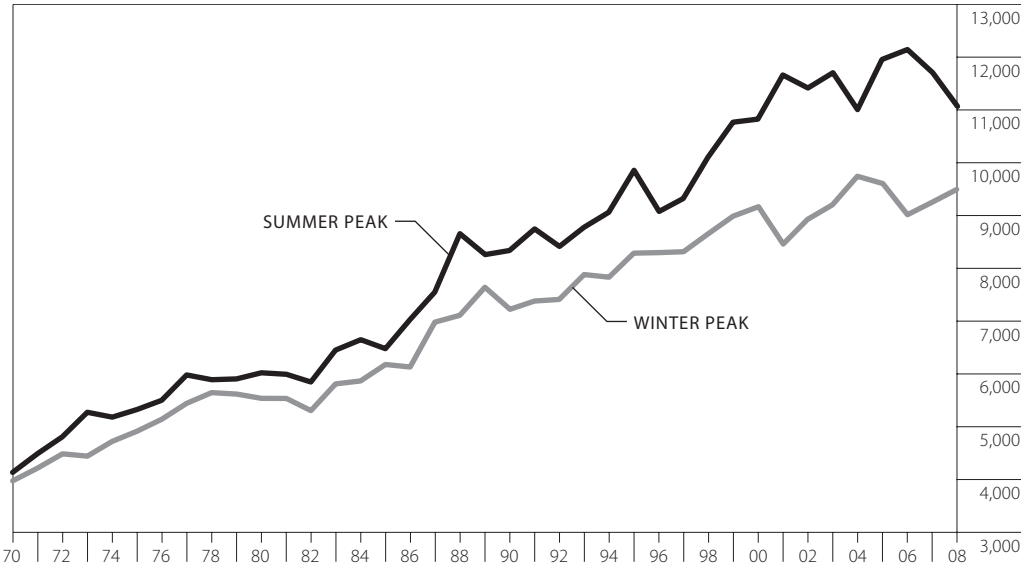
p Preliminary estimates.

r Revised.

Source: Wisconsin electric utility annual reports submitted to the Public Service Commission of Wisconsin (1970-2008); http://psc.wi.gov/apps/annlreport/content/munilist.aspx.

Eastern Wisconsin Electric Utility Non-Coincident Peak Demand

1970-2008 MEGAWATTS



HIGHEST PEAK
12,129
MEGAWATTS
SUMMER 2006

Eastern Wisconsin Electric Utility Power Load and Non-Coincident Peak Demand, by Month

2008

Month	Load (Millions of kWh)[a]	Non-Coincident Peak Demand (MW)[b]
January	5,924	9,237
February	5,530	9,124
March	5,534	8,643
April	5,156	8,174
May	5,200	7,991
June	5,619	10,342
July	6,437	11,060
August	6,194	10,815
September	5,302	10,911
October	5,293	8,505
November	4,950	8,437
December	5,791	9,482
Total	**66,930**	

The highest non-coincident peak demand in 2008 was seen in July.

a Wisconsin Electric Power Co., Wisconsin Power and Light Co., Wisconsin Public Service Corp., and Madison Gas and Electric Co.

b Non-coincident peak demand is the sum of the individual monthly peak electric demands from the four utilities listed above for each month.

Source: Wisconsin electric utility annual reports submitted to the Public Service Commission of Wisconsin (2008). http://psc.wi.gov/apps/annlreport/content/munilist.aspx.

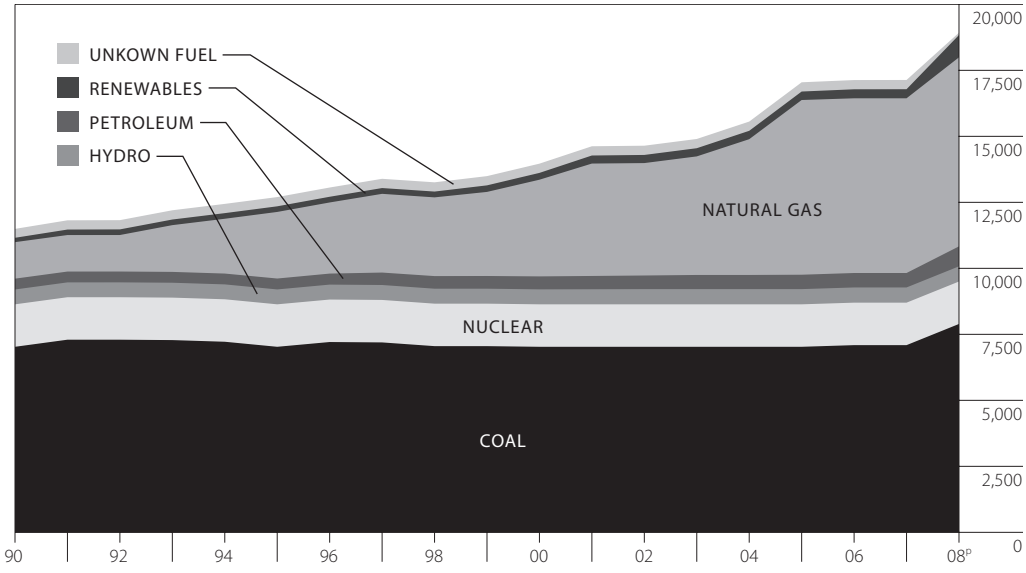
Wisconsin Electric Generating Capacity, by Type of Plant

ELECTRIC GENERATION CAPACITY
2,299
MEGAWATTS
(13.4 PERCENT)
IN 2007

In 2007, Wisconsin's electric generation capacity increased by 2,299 megawatts (13.4 percent). These data represent electricity generation capacity by Wisconsin's investor-owned utilities, municipal utilities, electric co-operatives, independent power producers, and other non-utility operations (e.g., paper mills).

The Renewables data include biomass (e.g., wood, paper byproducts, landfill gas, and methane digester gas), solar and wind. Out-of-state facilities are not included in the Renewables or the hydroelectric figures. These figures include renewable facilities that are not RPS-registered. The large jump in Renewables capacity is primarily due to new wind production installations.

1990-2008 MEGAWATTS



Year	Coal	Nuclear	Hydro	Petroleum	Natural Gas	Renewables	Unknown Fuel	Total[a]
1990	7,028	1,609	562	410	1,383	165	337	11,494
1991	7,297	1,609	562	410	1,383	208	350	11,819
1992	7,297	1,609	563	410	1,383	213	350	11,824
1993	7,282	1,609	564	410	1,771	213	350	12,198
1994	7,219	1,609	564	410	2,076	213	350	12,440
1995	7,028	1,609	564	413	2,522	213	350	12,700
1996	7,209	1,609	566	417	2,694	216	350	13,062
1997	7,194	1,609	566	471	2,982	219	350	13,391
1998	7,053	1,609	567	477	2,982	220	350	13,258
1999	7,053	1,609	567	481	3,185	248	350	13,494
2000	7,028	1,609	567	491	3,662	258	350	13,965
2001	7,028	1,609	571	503	4,258	305	350	14,624
2002	7,028	1,609	576	516	4,258	308	350	14,646
2003	7,028	1,609	576	536	4,491	310	350	14,900
2004	7,028	1,609	576	536	5,143	317	350	15,560
2005	7,028	1,609	576	545	6,618	321	350	17,048
2006	7,091	1,609	576	547	6,618	341	350	17,133
2007	7,091	1,609	576	547	6,618	344	350	17,137
2008[p]	**7,893**	**1,608**	**575**	**756**	**7,161**	**844**	**89**	**18,836**

a Capacity is as of December 31 of each year.

p Preliminary estimates.

Sources: Energy Information Administration, *Electric Power Annual*, [DOE/EIA-0348(2007)](October 2007), http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html. This table has been historically revised with data from the Public Service Commission of Wisconsin, Wisconsin Generating Capacity by Fuel (1990-2008); EIA data were used in previous publications.

Wisconsin Electric Generating Capacity, by Type of Plant and Type of Producer

1990-2008 MEGAWATTS

	Utility Generating Capacity[c]				Non-Utility Generating Capacity			All Producers Capacity Total
Year	Cooperatives	Investor-Owned Utilities	Municipal	Utility Total	IPP[a]	Non-Utility[b]	Non-Utility Total	
1990	937	9,404	204	10,544	62	889	951	11,494
1991	937	9,352	203	10,492	62	916	977	11,469
1992	937	9,352	203	10,492	62	921	983	11,475
1993	937	9,627	289	10,852	62	922	983	11,836
1994	937	9,904	289	11,129	62	922	983	12,113
1995	937	10,452	290	11,678	62	960	1,022	12,700
1996	937	10,379	375	11,691	62	936	998	12,689
1997	937	10,432	376	11,744	350	939	1,289	13,033
1998	937	10,433	382	11,751	530	939	1,469	13,220
1999	937	10,455	410	11,801	830	946	1,775	13,577
2000	937	10,794	421	12,151	830	984	1,814	13,965
2001	1,033	10,798	432	12,263	1,361	1,000	2,361	14,624
2002	1,033	10,804	440	12,277	1,362	1,008	2,370	14,647
2003	1,033	11,057	440	12,530	1,362	1,008	2,371	14,901
2004	1,036	11,058	492	12,586	1,961	1,013	2,974	15,560
2005	1,037	11,098	501	12,636	3,397	1,015	4,412	17,048
2006	1,037	11,098	566	12,702	3,397	1,034	4,431	17,133
2007	1,037	10,024	566	11,628	4,471	1,038	5,509	17,137
2008	**1,017**	**11,201**	**566**	**12,784**	**5,036**	**1,016**	**6,052**	**18,836**

These data represent the generation capacity of utilities, who are required to have power available to customers via the power grid; and merchant producers who produce power for wholesale (Independent Power Producers) to utilities; and non-utilities which are primarily industrial sector businesses producing electricity for in-house use, any excess of which may also be sold to utilities for retail re-sale on the power grid.

The 2008 increase in capacity is due in-part to two new coal-fired plants with a total capacity of 1,100.

These data were not available until 1990; the capacity listed for 1990 represents in-place capacity for all previous years of operation.

a IPPs are independent power producers allowed under law to sell their power to wholesalers such as utility co-operatives. They are barred from selling their power on the retail market.

b Non-utility sources refers to industrial power producers such as paper mills.

c Utilities include investor-owned utilities, electric co-operatives and municipalities.

Source: Public Service Commission of Wisconsin, Accounts and Finance Division, *Generating Plants Operated by Wisconsin Electric Utilities*, Bulletin #46 (1971-1994) and personal communications 2002; U.S. Department of Agriculture, Rural Electrification Administration, *Annual Statistical Report*, REA Bulletin 1-1 (1971-1994); Public Service Commission of Wisconsin, unpublished electrical generation data (1990-2008).

Wisconsin Electric Power Generation, by Type of Plant

ELECTRIC GENERATION 3.2%

Total electric generation by Wisconsin utilities increased 3.2 percent in 2008.

Utilities include investor-owned utilities, electric co-operatives and municipalities. *IPPs* are independent power producers allowed under law to sell their power to wholesalers such as utility co-operatives. They are barred from selling their power on the retail market. The primary fuel used by IPPs is uranium, followed by natural gas, wind and coal. *Non-utility* refers to industrial power producers such as paper mills. These generation facilities primarily use coal and renewable resources such as biomass, biogas and hydro to generate electricity for their own use.

Imports and losses is a reflection of the difference between total sales recorded by EIA and total sales reported by utilities and IPPs.

1970-2008 MILLIONS OF kWh

	Electricity Generation by Utilities[e]											
Year	Coal[b]	Nuclear	Hydro	Petroleum[d]	Natural Gas	Renewables[f]	Total Utilities	IPP	Nonutility[e]	Total IPP and Nonutility	Imports & Losses[c]	Total Sales[h]
1970	25,253	155	1,413	390			27,211			0	-2,496	24,715
1975	20,615	10,292	1,483	691			33,081			0	-1,805	31,276
1980	26,383	9,912	1,628	393			38,316			0	-571	37,745
1985	28,840	10,978	2,046	20			41,884			0	-159	41,725
1990[a,r]	27,956	11,224	1,301	76	393		40,950			0	8,248	49,198
1995[r]	32,994	10,970	1,528	97	924		46,513			0	11,454	57,967
2000[r]	41,736	11,459	1,458	52	965	43	55,713			0	8,976	64,689
2001[r]	40,855	11,507	1,739	99	815	51	55,066	2		2	10,909	65,977
2002[r]	42,368	12,449	2,099	43	910	62	57,931	0		0	9,068	66,999
2003[r]	44,140	12,220	1,513	93	1,008	62	59,036	404		404	7,801	67,241
2004[r]	45,149	11,888	1,964	56	574	69	59,700	0		0	8,100	67,800
2005[r]	45,219	7,574	1,934	75	2,185	105	57,092	2,648	275	2,923	10,596	70,336
2006[r]	42,936	12,234	1,831	215	1,928	234	59,378	3,662	2,534	6,196	6,769	69,809
2007[r]	39,877	0[g]	1,346	36	3,015	295	44,569	16,244	2,928	19,171	10,489	71,301
2008[p]	**40,949**	**0[g]**	**1,363**	**691**	**2,485**	**506**	**45,994**	**15,663**	**2,484**	**18,147**	**8,351**	**70,008**

a Beginning in 1990, data are from the Public Service Commission of Wisconsin, except for sales data.

b IOU coal data for 2007 include a small amount (9.3 thousand kWhs) of non-renewable refuse derived fuel.

c A negative sign indicates Wisconsin utilities exported electric power to other states.

d Petroleum (oil) was split from natural gas as a generation resource starting in 1990. Prior to 1990, they were combined in this table.

e Non-utility generation sources were available prior to 2005, but not collected separately until then.

f The renewables category includes biomass, methane from landfills and digesters, solar and wind resources.

g Wisconsin utilities no longer own nuclear generation; all nuclear reactors located in Wisconsin are owned by Independent Power Producers. Nuclear generation data can be found in the IPP category in the above table.

h Sales figures for all years are from the EIA Electric Power Monthly.

r Starting with the 2008 publication, these data were revised from previous publications that used federal Department of Energy, Energy Information Administration data. 2008 data are EIA-sourced data that will be revised using PSC data when available.

p Preliminary.

Source: Public Service Commission of Wisconsin, Accounts and Finance Division, *Generating Plants Operated by Wisconsin Electric Utilities*, Bulletin #46 (1971-1994) and personal communications 2002; U.S. Department of Agriculture, Rural Electrification Administration, *Annual Statistical Report*, REA Bulletin 1-1 (1971-1994); U.S. Department of Energy, Energy Information Administration, Electric Power Monthly (March 2008); Public Service Commission of Wisconsin, unpublished electrical generation data (2007-2008).

Wisconsin Electric Utility Fuel Costs of Power Generation, by Type of Plant

1970-2008 CENTS PER kWh

Year	Fossil Fuel Steam (Coal)	Nuclear Steam[b]	Internal Combustion[a]	Total
1970	0.43	0.16	0.75	0.44
1975	1.01	0.36	1.47	0.75
1980	1.72	0.50	3.58	1.40
1985	2.02	0.61	6.76	1.60
1990[e]	1.61	0.52	4.50	1.27
1995[e]	1.33	0.48	3.62	1.12
1996[e]	1.26	0.49	3.15	1.07
1997[e]	1.28	0.50	4.30	1.22
1998[e]	1.25	0.52	3.76	1.13
1999[e]	1.21	0.53	3.70	1.07
2000[e]	1.24	0.52	6.41	1.14
2001[e]	1.27	0.54	6.36	1.15
2002[e]	1.31	0.50	4.61	1.12
2003[e]	1.37	0.48	6.49	1.21
2004[e]	1.44	0.47	6.19	1.24
2005[e]	1.58	0.52	10.29	1.74
2006[e]	1.78	0.54	8.28	1.76
2007[e]	2.01	0.60	7.49	2.12
2008[e]	**2.21**	**0.00**	**7.14**	**2.44**

In this table, only the cost of fuel per kilowatt-hour of generation is reported. The table on the next page includes all costs of generation. Hydroelectric plants are not included here because they have no associated fuel costs.

Wisconsin utilities no longer own nuclear generation; all nuclear reactors located in Wisconsin are owned by Independent Power Producers. The costs in the table reflect costs incurred by Wisconsin's five largest investor owned utilities.

a Internal combustion includes both gas-powered turbines and diesel-powered engines.

b Nuclear cost.

e Estimate by Wisconsin Office of Energy Independence based on amount of generation by the five major Wisconsin utilities.

Source: Public Service Commission of Wisconsin, Accounts and Finance Division, *Generating Plants Operated by Wisconsin Electric Utilities*, Bulletin #46 (1971-1994); annual reports of the five major Wisconsin electric generating utilities (2008). http://psc.wi.gov/apps/annlreport/content/munilist.aspx

Wisconsin Electric Utility Total Costs of Power Generation, by Type of Plant and Cost of Purchased Power

This table shows the total cost of generating one kWh of electricity by various technologies in Wisconsin's electric utility plants. The average cost of power is more than double the previous peak in 1983 of 2.21 cents per KWh. The cost of purchased power has risen in recent years and is 43 percent more expensive than electricity generated in Wisconsin.

Wisconsin utilities no longer own nuclear generation; all nuclear reactors located in Wisconsin are owned by Independent Power Producers. The costs in the table reflect costs incurred by Wisconsin's five largest investor owned utilities.

1970-2008 CENTS PER kWh

Year	Fossil Fuel Steam (Coal)	Nuclear Steam[b]	Internal Combustion[a]	Hydro	All Plants	Purchased Power	Average Cost
1970	0.55	0.29	1.76	0.27	0.53	NA	NA
1975	1.25	0.51	2.73	0.32	0.97	NA	NA
1980	2.13	0.86	5.74	0.52	1.72	NA	NA
1985	2.55	1.32	19.12	0.61	2.09	NA	NA
1990[e]	2.13	1.50	10.87	1.00	1.94	2.22	1.99
1995[e]	1.80	1.63	4.71	0.71	1.75	2.17	1.83
1996[e]	1.68	1.73	4.69	0.64	1.67	2.15	1.77
1997[e]	1.68	4.37	5.09	0.69	1.94	2.27	2.04
1998[e]	1.68	2.83	4.70	1.02	1.94	2.67	2.11
1999[e]	1.68	2.03	4.83	0.87	1.79	2.96	2.05
2000[e]	1.75	2.16	7.73	0.86	1.91	3.36	2.24
2001[e]	1.76	2.37	7.63	0.90	1.95	3.90	2.41
2002[e]	1.87	2.18	6.09	0.75	1.97	3.64	2.40
2003[e]	1.91	2.40	8.02	1.12	2.10	4.05	2.61
2004[e]	1.97	2.46	14.63	1.06	2.19	4.26	2.72
2005[e]	2.11	3.16	16.02	1.21	2.82	4.92	3.53
2006[e]	2.68	2.10	14.81	1.40	3.01	5.55	3.88
2007[e]	2.94	2.54	11.76	1.65	3.42	5.58	4.23
2008[e]	**3.49**	**0.00**	**13.29**	**1.53**	**4.01**	**5.72**	**4.75**

a Internal combustion includes both gas powered turbines and diesel powered engines.

b Nuclear reactors in Wisconsin are owned by independent power producers.

e Estimate by Wisconsin Office of Energy Independence based on amount of generation by the five major Wisconsin utilities.

NA – Not available.

Source: Public Service Commission of Wisconsin, Accounts and Finance Division, *Generating Plants Operated by Wisconsin Electric Utilities*, Bulletin #46 (1971-1994); annual reports of the five major Wisconsin electric generating utilities (2007). http://psc.wi.gov/apps/annlreport/content/munilist.aspx

Electric Utility Sulfur Dioxide Emissions

1980-2008 TONS

Year	1980	1990	2000	2005[r]	2006[r]	2007[r]	2008[p]
Dairyland Power Cooperative							
Alma	23,641	6,510	3,445	8,816	11,748	10,748	9,558
J.P. Madgett	4,088	7,330	5,376	7,762	7,807	8,028	9,114
Genoa	43,516	28,130	8,165	13,074	13,658	12,480	11,970
Stoneman	4,663	790	0	0	0	0	0
Madison Gas and Electric Co.							
Blount Street	8,436	3,851	6,923	5,969	2,617	2,767	2,961
Northern States Power Co.							
Bay Front	2,708	393	786	1,196	944	1,149	1,041
Wisconsin Electric Power Co.							
Oak Creek	122,472	45,650	22,831	12,903	13,594	13,692	14,471
Port Washington	42,295	4,009	15,572	2	3	4	4
Valley	41,761	14,053	15,835	8,482	7,087	6,848	6,886
Pleasant Prairie	4,972	26,933	28,726	33,656	28,566	2,229	1,092
Wisconsin Power and Light Co.							
Blackhawk	2,006	0	0	0	0	0	0
Columbia 1	24,937	18,616	15,056	13,729	10,616	12,093	13,562
Columbia 2	14,614	13,909	13,270	12,370	11,780	13,332	13,303
Edgewater 1-4	60,014	38,021	8,962	9,103	7,675	7,166	7,205
Edgewater 5	0	6,744	8,744	7,741	8,084	9,502	7,858
Nelson Dewey	32,304	10,985	14,275	14,999	14,519	15,064	27,063
Rock River	14,139	7,220	24	12	2	2	3
Wisconsin Public Service Corp.							
Pulliam	42,087	25,631	6,314	12,175	10,869	10,448	8,446
Weston 1,2	21,009	6,589	3,340	3,988	3,278	2,984	2,853
Weston 3	0	7,598	8,358	9,540	9,318	6,125	7,338
Weston 4							333
Municipal Utilities							
Manitowoc	1,318	1,727	3,282	217	732	1,033	1,706
Marshfield	1,651	139	0	0	0	0	0
Menasha	991	695	79	0	0	0	0
Total							
Utility Sources	**513,622**	**275,523**	**189,374**	**175,734**	**162,897**	**135,694**	**146,767**
All Other Sources	**172,777**	**101,517**	**87,115**	**68,600**	**67,391**	**67,835**	**87,883**
All Stationary Sources	**686,399**	**377,040**	**276,489**	**244,334**	**230,288**	**203,529**	**234,650**
Percent Utility Sources	**74.8%**	**73.1%**	**68.5%**	**71.9%**	**70.7%**	**66.7%**	**62.5%**

SULFUR DIOXIDE EMISSIONS
8.2%

Utility sulfur dioxide emissions increased 8.2 percent from 2007 to 2008. Declines in total emissions will depend on the growth in coal fired generation, old plant retirement, the effectiveness of future energy efficiency efforts and increased use of natural gas and renewable energy.

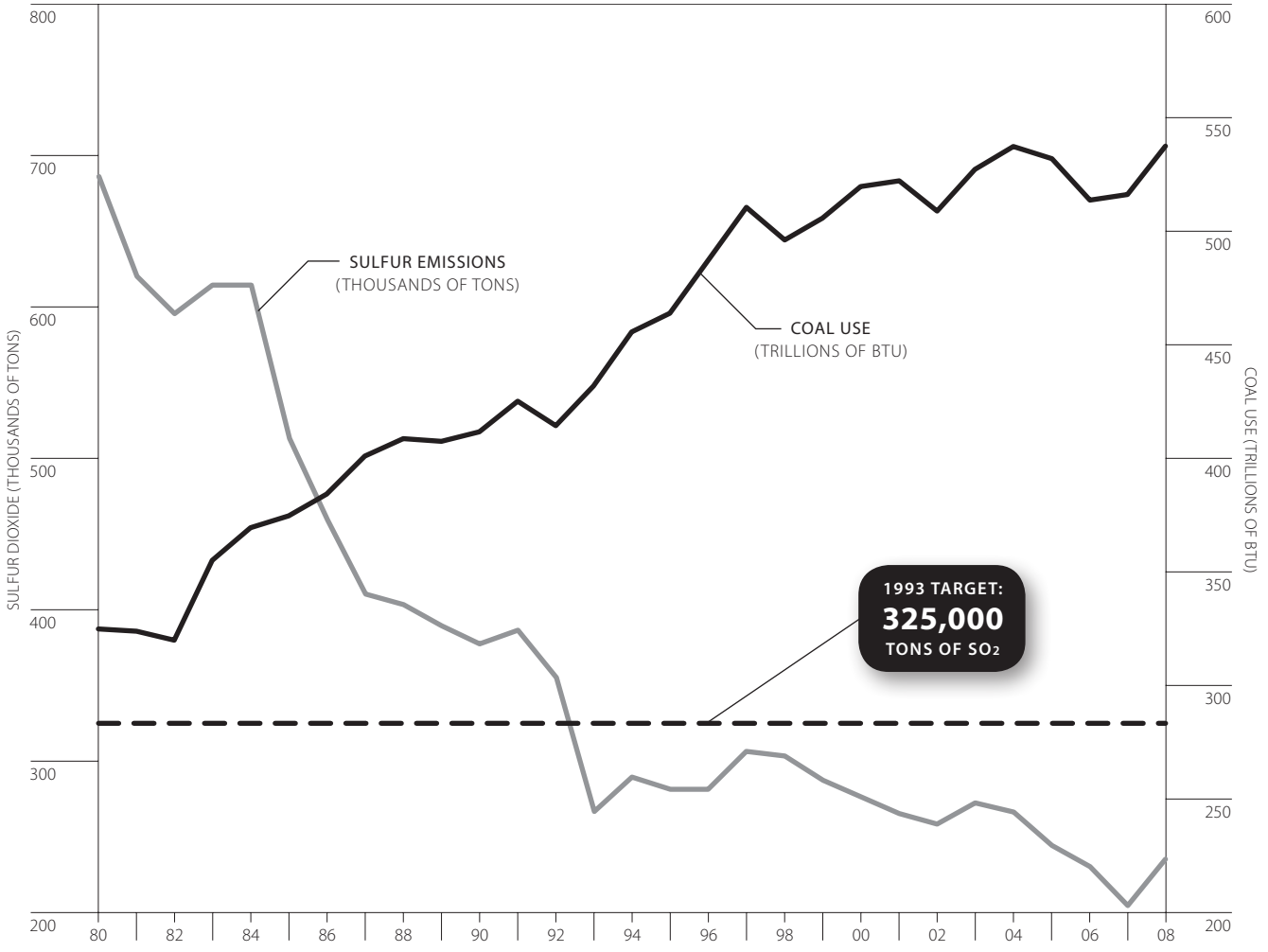
p Preliminary estimates.

r Revised.

Source: Wisconsin Department of Natural Resources, Annual Survey of Point Source Emissions, Sulfur Dioxide and Nitrogen Oxides Emissions Report PUBL-AM-343 (1986-2008).

Wisconsin Sulfur Dioxide Emissions and Coal Use

1980-2008



Source: Wisconsin Office of Energy Independence.

Wisconsin Utility Power Plant Inventory, 2008

Utility / Site[a]	Nameplate Capacity (MW)	Number of Units	Primary Fuel
Dairyland Power Cooperative			
Alma 1-3	58.1	3	Coal
Alma 4,5	136.0	2	Coal
Elk Mound	92.4	2	Gas
Flambeau	21.2	3	Hydro[b]
Genoa 3	345.6	1	Coal
J.P. Madgett	387.0	1	Coal
Seven Mile Creek	4.1	3	Landfill Gas
Madison Gas and Electric Co.			
Blount Street 3,4,5,6,7	177.5	5	Coal / RDF[c]
Diesel	54.0	1	Oil
Fitchburg 1,2	57.6	2	Gas
Nine Springs	16.2	1	Gas
Rosiere	11.2	17	Wind
Sycamore	41.6	2	Gas
West Campus	168.5	3	Gas
West Marinette	250.1	1	Gas
Northern States Power Co.			
Bay Front 4,5,6	68.0	3	Wood / Coal
Flambeau	16.0	1	Gas
French Island 1,2	31.3	2	Wood / RDF[c]
French Island 3,4	157.6	2	Oil
Various Hydro	235.4	57	Hydro[b]
Wheaton 1-6	322.0	6	Gas / Oil
Wisconsin Electric Power Co.			
Blue Sky Green Field	145.2	88	Wind
Byron	1.3	2	Wind
Concord	381.2	4	Gas
Germantown 1,2,3,4	244.8	4	Oil
Germantown 5	106.9	1	Gas
Milwaukee	11.0	1	Coal
Paris	381.2	4	Gas
Pleasant Prairie 1,2	1,233.0	2	Coal
Pleasant Prairie 3	2.0	1	Oil
Port Washington 1-3	1,158.0	3	Gas
S. Oak Creek 5-8	1,191.6	4	Coal
S. Oak Creek 9	19.6	1	Gas
Valley 1,2	272.0	2	Coal
Valley 3	2.7	1	Oil
Various Hydro	13.6	8	Hydro[b]
Wisconsin Public Service Corp.			
Eagle River	4.0	2	Oil
Glenmore	1.2	2	Wind
Lincoln	9.2	14	Wind
Oneida Casino	4.0	2	Oil
Pulliam 31	83.0	1	Gas
Pulliam 3-5	110.0	3	Coal
Pulliam 6-8	300.2	3	Coal
Various Hydro	55.3	30	Hydro[b]
W. Marinette 31,32,33[e]	250.1	3	Gas
Weston 1-4	992.1	4	Coal
Weston 31,32	72.5	2	Gas
Wisconsin Power and Light Co.			
Blackhawk 3,4	50.0	2	Gas
Cedar Ridge	67.7	41	Wind
Columbia 1[f]	512.0	1	Coal
Columbia 2[f]	511.0	1	Coal
Edgewater 3	60.0	1	Coal
Edgewater 4[g]	330.0	1	Coal
Edgewater 5[h]	380.0	1	Coal
Nelson Dewey 1,2	200.0	2	Coal
Rock River 1,2	150.0	2	Gas
Rock River 3-6	144.0	4	Gas
Sheepskin	40.0	1	Gas
South Fond Du Lac	172.0	4	Gas
Various Hydro	36.6	12	Hydro[b]
Municipal Utilities			
Manitowoc, City of	11.0	2	Gas
	127.0	3	Coal / RDF[c] / Coke
Menasha, City of	21.1	3	Coal
Merchant/IPP			
Kewaunee	560.1	1	Nuclear
Point Beach	1,047.6	1	Nuclear
Statewide Utilities			
Statewide	7,370.2	57	Coal
Statewide	3,914.4	81	Natural Gas
Statewide	463.9	271	Hydro
Statewide	82.9	54	Biomass, Biogas, Solar
Statewide	716.9	118	Petroleum
Statewide	235.8	164	Wind
Statewide Totals	**12,784.1**	**745**	**All**

a Does not include non-utility generation, all electric cooperatives or all municipal utilities.

b Hydroelectric capacity differs from sums on other tables due to different data sources.

c RDF is Refuse Derived Fuel.

e The West Marinette 33 unit is jointly owned by Wisconsin Public Service Corp. (68%) and the City of Marshfield (32%).

f The Columbia 1 & 2 units are owned by Alliant Energy (46.2%), Wisconsin Public Service Corp. (31.8%) and Madison Gas & Electric Co.(22.0%).

g The Edgewater 4 unit is owned by Alliant Energy (68.2%) and Wisconsin Public Service Corp. (31.8%).

h The Edgewater 5 unit is owned by Alliant Energy (75%) and Wisconsin Electric Power Co. (25%).

Source: U.S. Department of Energy, Energy Information Administration, Existing Electric Generating Units in the United States by State, Company and Plant, http://www.eia.doe.gov/cneaf/electricity/page/capacity/capacity.html (through 2007); Public Service Commission of Wisconsin, unpublished data (2008).